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Assaults have been made on my life in the past, but God has spared me till now, and the assailants have repented for their action. But if some one were to shoot me in the belief that he was getting rid of a rascal, he would kill not the real Gandhi, but the one that appeared to him a rascal.

M K Gandhi

Suddenly they become still and gasp for breath as they
gaze at the figure lying dead.
The women sob loud and men hide their faces in
their hands.
A few try to slink away unnoticed,
but their crime keeps them chained
to their victim.
They ask each other in bewilderment,
'Who will show us the path?'
The old man from the East bends his head and says:
'The Victim.'
They sit still and silent,
Again speaks the old man,
'We refused him in doubt, we killed him in anger,
now we shall accept him in love,
for in his death he lives in the life of us all, the
great Victim.'
And they all stand up and mingle their voices and sing,
'Victory to the Victim.'

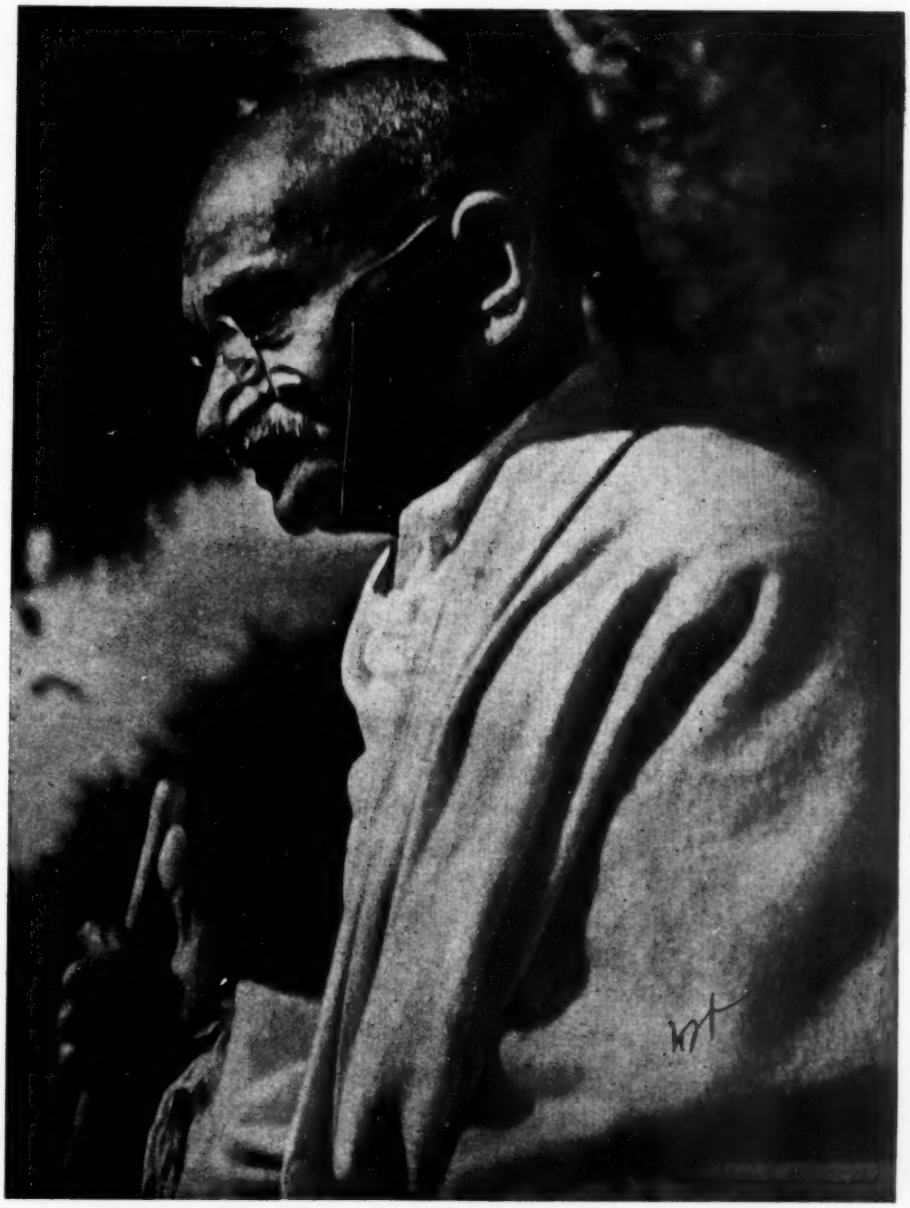
Rabindranath Tagore

MAHATMAJI, THE GREATEST HEALER

We pay our reverential homage to Mahatmaji. He was the harbinger of peace in a war-torn world, and yet it is a matter of infinite shame and mortification for India that he lost his life at the hands of an Indian assassin. It is an irreparable loss and an immeasurable catastrophe for the Indian Nation as a whole to have lost its greatest leader at a time when his services were most required and when he attained to the highest stature in the bar of world opinion. He was the patriarch of the Indian nation,—the architect of India's independence and the apostle of non-voilence and truth. It is the saddest tragedy for all times that the crusader of non-violence should be crucified himself. He was not only the high priest of communal unity and amity but the torch-bearer of renaissance and resurrection in India. The world has lost in him the greatest man since the days of Buddha and Christ. He synthesised in him the confluence of ancient and modern culture and of all that was noblest and best in the civilisation of the two worlds. In fact during the last half a century of strife and turmoil in India, he was virtually the only pivot round which were arrayed all the national, social, cultural and political activities of the country. We share this most lamentable calamity with all our countrymen and appeal to them to bear the bereavement with calmness and forbearance and to act with faith and fortitude in accordance with the lofty ideals preached and inculcated by Mahatmaji to the last moment of his life. We pray that his soul may rest in eternal beatitude and peace. We leave it to chroniclers of contemporary times to record the details of his life. It has been very properly suggested that a 'Gandhi-Peace-University' should be built round his life and work, which will become the place of pilgrimage for students of international repute.

We shall be content with touching only one aspect of Gandhiji's life and try to understand him as the greatest healer of ills that infest a man, the wounds that hurt him and the cankers that eat into his vitals in course of his—'pilgrim's progress'—from birth to death and beyond.

To a world, reeking with the frenzy of strife and violence, of covetousness and greed, he threw his gauntlets and stood alone as a mountain among men, believing in man's fundamental goodness and preaching the classical commandments which constitute the highest common factor of all the religions of the world. The Mahatma has suffered his vulnerable body to die, only to live in his soul in his eternal ethereal being, shedding lustre on the paths of men to guide them to their destination, in attaining to their full stature of mental and physical health, peace and happiness.



MAHATMA GANDHI

Born—Oct. 2, 1869 Died—Jan. 30, 1948

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In modern times after ages of torpor and inertia Psychological Medicine is making long and rapid strides. It has come to be recognised as *sine qua non* for the understanding of all psycho-physiological symptom-complex that man falls victim to. Besides the study of Social and Industrial Medicine, and the measurement of Community-health with the yard stick of positive health and physical efficiency has convinced all modern students of medicine that any therapeutic speculation, which seeks to treat the man leaving aside the—*milieu*—or his entire ecological and environmental setting is likely to end in futility. This throws open a flood-gate of newer light on the study of the treatment of 'man'—and his *milieu* in relation to diseases. The future of medicine lies in a forward march far beyond the range of anatomy and physiology—normal or morbid. It makes medicine a cousin to psychology, sociology and philosophy. All through his life Mahatma Gandhi strove hard to carry out in practice the ideal of establishing a social order from which the elements of exploitation and violence would be completely weeded out,—distinction between class and class obliterated and wherein every man and woman would enjoy equal opportunities for the fullest mental, physical and spiritual development. Mahatmaji, by dint of both example and precept led mankind from war to peace, from darkness and misery to light and joy, from savagery to civilization. His life was one of constant activity, full of events that led to the turn of tides in the history of the country nay,—in the history of mankind.

"Science is a slave. It is commandeered by war, to kill men and by medicine to save them." Louis Pasteur said—"Two contrary laws seem to be wrestling with one another now-a-adays, the one a law of blood and death, ever imagining new means of destruction, ... the other a law of peace, work and health ever evolving new means of delivering man from the scourges that beset him". Freud said "Die we must ultimately, but in the meantime we can live if we can love." This medicine 'love', which is the panacea for all sorrows and ills that beset mankind, was preached and prescribed by Buddha and Jesus. It is this medicine again which Mahatmaji had been preaching to us anew, for the last half a century.

He made no distinction between private and public morals. A man who lies and deceives in public life will be a liar and deceiver in private life. Only a decent man will be decent in all things. Man must prevent the inner rot of lust, hatred and anger in order to achieve *mens sana in corpore sano*—which is the *summum bonum* of human life—both for the private individual as well as for the statesmen and pilots of nation. For, as he has said, a written constitution, a parliament, a bureaucracy, the police and the army cannot guarantee democracy nor the state ensure it, if its citizens lack uprightness. It is the individual's health of the mind and body that is reflected on the State and *vice versa*. Love, fellow-felling and philanthropy, the prin-

ciple that true enjoyment lies in making others enjoy, that true happiness lies in making others happy as enunciated by the *Ishoupanishada*—are the laws of life on which man must depend, willy nilly to realize happiness and health for himself and contribute to the growth and development of a healthy and happy state. Mahatmaji laid great stress on the internal and external purity and cleanliness for the prevention of diseases. He enjoins self-control, moderation, regularity of regimen as to food and sleep, exercise and work according to the common injunctions of scripture and sanitary science. His compassion for the ill and invalid, men and animals, his pity for sufferers from leprosy, and his personal nursing of patients, his Red Cross services in the Boer-War, his services in India in all her natural catastrophe and pestilence will place him at the topmost rank for his services to suffering creatures for all time to come.

He had his own philosophy of looking at life, nevertheless he believed in scientific medicine. He submitted himself willingly to be operated upon for appendicitis by the Government Surgeon and did not like to exercise any will of his own in the choice of a surgeon. He believed in the uniformity and rationale of scientific treatment.

Whilst laying the foundation stone of an Ayurvedic institution he advised that the mere feeling of the pulse of the right-hand in the male and of the left hand in the female would not carry conviction nor would help in the diagnosis of difficult internal diseases. The empiric use of drugs of which one knows little and their administration on human body of which one knows even less, will not do for any system or school of medicine. There was a flutter all over India for these remarks of his; To him Truth,—in any shape or form,—scientific or otherwise—was God. Science must comprehend and realize truth. It must not be static but progressive in its outlook—constantly conquering ignorance and darkness. His life was a living message to men in all parts of the world for all time to come. Were he to live after this murderous outrage—and if the villain who laid violent hands on him to turn to him in the words of Macbeth

"Canst thou not minister to a mind diseased
Pluck from the memory a rooted sorrow
Raze but the written troubles of the brain
And with some oblivious antidote
Cleanse the stuffed bosom of that perilous stuff
Which weighs upon the heart?"

we feel sure he would have himself laid that soothing unguent on that penitent sinner—with forgiveness and love.

EFFECT OF STREPTOMYCIN THERAPY ON ENDOBRONCHIAL TUBERCULOSIS

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Twelve cases of endobronchial tuberculosis treated with streptomycin at Trudeau Sanatorium during the period of from May 2, 1946, to August 15, 1947, are presented. Only those who had completed their course of treatment are considered. The twelve patients under study were bronchoscoped immediately before and after treatment.

All the patients had some form of parenchymal involvement as seen by the x-ray. Of these, five had moderately advanced bilateral lesions ; one had had a thoracoplasty on the left side and there was a small amount of infiltration and fibrosis in the lower portion of the upper half of the right lung ; three had unilateral involvement of moderate degree ; one had atelectasis of the right middle lobe and a 2 cm. cavity on the lower portion of upper lobe ; one showed evidence of bilateral parenchymal disease and in the apex of right lung a cavity 2×7 cm. and in the outer 2nd i.s. and in the middle 3rd at the level of 7 is. smaller areas of rarefaction-cavity.

It is well known that the presence of endobronchial tuberculosis adds to the seriousness of the outlook and affects the treatment and course of pulmonary tuberculosis. The problem is essentially one of interference with bronchial drainage. There may be partial or almost complete obstruction by granulation tissue or cicatricial stenosis. There may be destruction of cartilage resulting in collapse of the bronchial wall, thus producing partial blocking of the bronchus and trapping of air in the lung. Patients may develop dyspnoea and in extreme cases, cyanosis. Tuberculous ulcerations of the bronchi cause narrowing of the lumen which may lead to collapse—atelectasis—of the air cells, supplied by the occluded bronchus. This may be followed by suppuration or abscess formation, or on the other hand, collapse of a segment or lobe may have a beneficial effect on the tuberculous process. The cough is usually out of proportion to the amount of disease present and the sputum is almost always positive for tubercle bacilli. There is frequent elevation of the temperature.

The sputum of the 12 patients was examined both by smear and culture methods before start of streptomycin and every two weeks during the course of therapy. Blood counts and phenolsulphonphthalein tests were made at frequent intervals. The tubercle bacilli of each patient were checked routinely for sensitivity and the development of resistance to the drug. The patients were also carefully watched for the development of toxic symptoms.

The amount of streptomycin given varied in different cases. In the earlier group of patients, the usual dose was 2 grams a day, divided into 3 doses given at 8 hour intervals, but later the dosage was reduced to 1 gram a day (0·5 × 2) and several patients received only 0·5 grams once a day). The intramuscular route was used in all cases. The average blood level in 2 hours was 16 units per c.c. in these cases. Two patients were given aerosol therapy (0·5 grams per day, divided into 5 doses—1 gram 5 times a day) in addition to the intramuscular drug. Of these patients, one developed severe nasal irritation and the aerosol treatment had to be discontinued. Some workers believe aerosol is of doubtful value in the treatment of tuberculosis because it does not penetrate to the affected bronchial areas nor is it absorbed to any appreciable extent. The number of days of treatment varied from 42 to 135 days. One patient did not complete the course due to the development of severe toxic reactions.

TABLE I—SHOWING SEX AND AGE DISTRIBUTION OF PATIENTS

Sex	*Age in Years*	*Numbers*
Male	... 27—40	3
Female	... 26—56	9

Table I shows that there were 3 males and 9 females. The age of the patients among males was from 27-40, and among females, it was from 26-56 years. It is evident from the above that the number of female cases in this series exceeds the number of male patients by a ratio of 3 : 1. This marked tendency of females to develop endobronchial disease has been noted by various observers.

TABLE II—SHOWING SYMPTOMS PRIOR TO THERAPY WITH STREPTOMYCIN

No.	*Name*	*Cough*	*Expectoration.*	*Tubercle Bacilli in Sputum*	*Wheeze*	*Haemoptysis*	*Hoarseness*	*Weight loss*	*Fever*
1.	A. C.	+	+	+	–	+	–	+	+
2.	L. L.	+	+	+	+	–	+	+	+
3.	R. S.	+	+	+	–	–	–	+	+
4.	T. J.	+	+	+	+	–	–	–	–
5.	M. J.	+	–	+	+	–	–	–	+
6.	M. B.	+	–	+	+	–	–	–	+
7.	E. C.	+	–	+	+	–	–	+	–
8.	E. W.	+	+	+	+	+	–	–	+
9.	C. C.	+	+	+	+	–	–	+	–
10.	F. F.	+	+	+	+	+	–	–	+
11.	W. H.	+	+	+	+	–	–	+	+
12.	R. M.	+	+	+	+	–	–	–	–
12		12	9	12	10	3	1	6	8

Table II shows that these patients showed various symptoms, the most prominent being cough, expectoration, wheeze, hæmoptysis, loss of weight, and fever. All patients had cough, the degree varying from slight to severe. Expectoration of moderate to large amount was noted in 9 cases, the character of the sputum being either mucoid or mucopurulent. All the patients had sputum positive for tubercle bacilli before treatment, 11 being positive both by smear and culture. One had positive sputum by culture only. Cough and wheeze were

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the two chief symptoms of the patients, cough being noted in all 12, and a wheeze of varying intensity was noted on the admission examination in 10. Hæmoptysis occurred in 3 ; hoarseness in 1 ; weight loss in 6 ; and fever varying from 99° to 102°F. in 6. Six of them had other complaints which included mild forms of headache, dyspnoea, pleuritic pain, diarrhœa, indigestion, and abdominal cramps.

TABLE III—SHOWING TOXIC MANIFESTATIONS FOLLOWING THERAPY WITH STREPTOMYCIN

No.	Dizziness and/or staggering	Eye symptoms	Reduced hearing acuity	Skin rash	Nausea, vomiting	Fever	Other complaints
1.	–	–	+	+	–	–	—
2.	–	–	–	–	–	–	Nasal irritations
3.	–	–	–	+	+	–	Headache, pain
4.	+	–	–	–	–	–	—
5.	+	–	–	–	–	–	Headache, pain
6.	+	+	+	–	+	–	Nervousness, profuse menstruation
7.	–	+	–	+	+	–	—
8.	+	–	–	+	–	–	Pruritus
9.	+	–	–	–	+	–	Headache, pain, indigestion
10.	–	–	–	–	–	–	—
11.	+	–	–	–	–	–	Precordial pain, gastric disturbance
12.	–	–	–	–	–	–	Headache, sore throat, increased cough and expectoration
	6	2	2	4	4	0	9

Table III, shows that the patients showed various types of toxic manifestations following the therapy. These were noticed in most of the cases on the average after the 24th day of therapy. Six patients developed moderate to severe dizziness, two had eye symptoms consisting of blurring of vision and inability to read small types or write, and two had difficulty in hearing. Four patients developed skin rashes and pruritus, four had nausea and vomiting. Nine had other complaints which included: headache, gastric disturbances, indigestion, diarrhœa, precordial pain, profuse menstruation, pruritus, nervousness, etc., along with other symptoms already mentioned.

Some workers believe that the reaction produced by this drug is due to impurities retained in the preparation of streptomycin ; others suggest they are on an allergic basis. They have suggested changing the particular brand or lot which produces the reactions. Pain at the site of injection was noted by several patients.

SITE AND NATURE OF LESION

All types and degree of endobronchial lesions were seen in these cases. They included hyperæmia, œdema, ulceration, granulation, scarring, and stenosis. These lesions were seen either in one form alone or in a combination of more than one type. Of the 12 patients, 6 had lesions on the right side and 6 had lesions on the left. The lesion was in the main bronchus in 7, and in one of the branch bronchi in 5. In 2 patients, the lesions were seen to extend into trachea. One also had a thickened carina.

TABLE IV—SHOWING BRONCHOSCOPIC FINDING BEFORE AND AFTER THERAPY

Before	Therapy	After
1. Narrowing of left main bronchus with swelling and closure on cough. Orifice of the left upper lobe narrowed, red, and swollen.	Streptomycin 42 grams, 1 gm. daily in 2 (0·5) doses	Scarring of lateral wall of the left main bronchus. Upper lobe orifice seen through telescope. There is marked scarring and the lumen is narrowed to 60%
2. Ulcerated lesion in right main bronchus.	Streptomycin 51·5 grams, 2 gms.-4 days, 1 gm.-rest of period.	Complete healing of lesion with stenosis.
3. Ulceration and stenosis of right main bronchus beyond the right upper lobe orifice, but above the right middle lobe.	Streptomycin 45 grams, 2 gms.-3 days, 1 gm. daily rest of period.	Marked constriction just below the right upper lobe bronchus, such that the middle lobe orifice and dorsal branch orifice could not be seen. It was posible to pass the aspirating tip beyond the constriction. The lumen was obliterated on expiration. When the tip was pressed on the medial wall, there was some oozing. Lesion seemed to be worse.
4. Tuberculous involvement of the mucosa of left lateral wall of the trachea, 1·5 cm. above the carina, extending down into the left main bronchus with narrowing on expiration of the left main bronchus.	Streptomychin 52·5 grams. and 25% silver nitrate topically, once. 2 gms.-6 days, 1 gm.-4 days, 0·5 gm. rest of period.	Bronchial mucosa healed. Stenosis has progressed. Ulceration seen again 6 weeks later.
5. Tuberculosis of the right upper lobe bronchus. Swelling, redness, and granular surface.	Streptomycin 29·5 grams, 0·5 gm. daily.	Reduction in swelling and redness.
6. Left lateral wall of trachea just above carina bulges in. Below the orifice of the right upper lobe, the lumen of the bronchus was narrowed.	Streptomycin 114 grams, 25% $AgNO_3$, 2 gms.-38 days, 1 gm.-22 days, 0·5 gm.-32 days.	Right main bronchus clear. Trachea clear. Right middle lobe bronchus normal. Below this there was some reddening, some decrease in the size of the lumen, but definite improvement since last time. Orifice of medial basal branch visible, but smaller than usual, the edges being swollen. Orifice of the lower lobe bronchus swollen. There was definite improvement.

TABLE IV—*Contd.*

Before	*Therapy*	*After*
7. Annular lesion and granulation in the right main bronchus.	Streptomycin 33 grams, 2 gms.-4 days, 1 gm.-5 days, 0·5 gm.-rest of period.	Bronchoscopy could not be done due to violent reaction to anesthesia.
8. Deviation of left main bronchus upwards and a reddened area on the superior surface of the left main bronchus just before the left upper lobe orifice. No secretion, ulceration, or hypertrophy.	Streptomycin 43 grams, 1 gm. daily for 43 days.	Clearing of the left main bronchus. Some redness of the mucous membrane.
9. Tuberculous ulceration with stenosis and granulation in left main bronchus.	Streptomycin 190·5 grams., 2 gm.-30 days, 1 gm.-31 days, 0·5 gm.-36 days, Aerosol, 0·5 gm.- 64 days.	At approximately 3 cm. below the carina, there is a sharp narrowing of the bronchus. There is stenosis of such a degree that 8 French bougie will not go through. The surrounding wall is reddened and irregular. Worse than before.
10. Constriction of the left upper bronchus and ulceration on the left lateral wall of main bronchus between the upper lobe and carina.	Streptomycin 101 grams, 1 gm.-86 days, Aerosol, 0·5 gm.-72 days.	2 cm. down the left main bronchus orifice is narrowed and triangular in shape, no ulceration or granulation. Definite improvement. Disease appears to be confined chiefly to the lateral wall of the main bronchus between the upper lobe and carina.
11. Orifice of right upper lobe bronchus narrowed because of swelling of mucosa which showed longitudinal striation. No ulceration. Mucosa injected.	Streptomycin 42 grams, 1 gm.-42 days.	Orifice of the right upper lobe bronchus found somewhat narrowed. Longitudinal striation absent. No apparent involvement of bronchial mucosa.
12. Carina slightly thickened. Diffuse redness along lateral wall of left main bronchus with granulation above the upper lobe orifice.	Streptomycin 45 grams, 25% $AgNO_3$, 1 gm. for 45 days.	Left main bronchus narrowed 2 cm. beyond carina. The mucous membrane was somewhat reddened and some bleeding with instrumentation. No ulceration or granulation.

Table IV, shows the nature of the endobronchial lesion as recorded by the bronchoscopist before and after the therapy. Bronchoscopy was not always performed by the same doctor on the same patient, so the detailed reports after therapy do not always coincide with the previous reports, although the diagram of previous findings and records are reviewed by the bronchoscopist before the examination.

TABLE V—SHOWING RESULTS OF STREPTOMYCIN THERAPY

No.	*No. of days*	*Total grams*	*Cough*	*Sputum*	*Results*
1.	42	42	I.M. Disappeared	+	Apparently healed & marked stenosis
2.	43	51·5	I.M. & AE. Improved	−	Apparently healed and stenosis
3.	49	45	I.M. Improved	−	Worse
4.	88	52·5	I.M. Worse	+	Worse
5.	59	29·5	I.M. Unimproved	−	Improved
6.	92	114	I.M. Improved	−	Improved
7.	49	33	I.M. Improved	−	Not known
8.	43	43	I.M. Improved	+	Improved
9.	135	190·5	I.M. & AE. Improved	±	Worse & stenosis
10.	86	101	I.M. Improved	+	Improved
11.	42	42	I.M. Improved	−	Improved
12.	45	45	I.M. Improved	+	Improved

Table V shows the result of the therapy on cough, sputum, and the bronchial lesion. In 3 cases, sputum remained positive after the therapy, and in 8 cases, the sputum was converted to negative. Cough improved in 9 cases. In 1, cough disappeared completely, and in one, it became worse. The expectoration diminished in quantity in most of the cases following the therapy. The character of sputum also changed, there being less purulent material. Almost all the patients noticed an increased sense of well being. How much of this is psychological is difficult to determine. Elevation of temperature also disappeared in all cases. Some patients also gained in weight.

In 2 cases, apparent healing was noticed bronchoscopically, although in one of them, the sputum still remains positive. One patient was not bronchoscoped after the therapy because of severe reaction to local anæsthesia, although the cough improved considerably and the sputum became negative. Three cases became definitely worse after the therapy.

In 5 patients the lesions improved, but there was some stenosis noticed. Thus, it is evident that streptomycin has reduced the cough and expectoration, changed the character of sputum and the bacillary content of the sputum in the majority of cases. Sputum has become negative for tubercle bacilli in 7 cases. Streptomycin also appears to have some beneficial effect on early inflammatory bronchial lesions. This will be seen from the 5 cases whose lesions were detected early and who showed apparent healing by bronchoscopy. But, it has failed to produce any appreciable result in the old and chronic type of lesion where fibrosis with stenosis has already taken place. Stenosis seemed to progress in spite of the therapy. Marked improvement was noticed in the patient's general condition in most of the cases.

SUMMARY AND CONCLUSION

1. Twelve cases are reported who were treated with streptomycin for known endobronchial tuberculosis.

2. Incidence of endobronchial tuberculosis in this series is much higher in the females than in the males.

3. Seven patients had lesions in the main bronchi, and five had lesions in the branch bronchi.

4. Streptomycin was of definite value in reducing cough and expectoration.

5. It improved the general condition of the patient clinically.

6. Only early hypertrophic inflammatory types of lesion seemed to improve greatly with this therapy.

7. Although its effect in chronic ulcerative type is encouraging, it is not as satisfactory as in inflammatory lesion.

8. It had no effect on stenosis when due to fibrotic changes.

9. Sputum was converted in most of the cases during course of therapy.

10. It produced various toxic manifestations, the commonest being dizziness.

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STUDIES ON THE INCIDENCE OF Rh-Hr TYPES IN SOUTH INDIA

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(From the King Institute of Preventive Medicine, Guindy, Madras)

The importance of the Rh factor described by Landsteiner and Wiener (1940) to the immunologist, anthropologist and genetecist has stimulated studies on the distribution of the Rh factor throughout the world. Its frequency among the white population, whether in the U.S.A., in Europe or in Australia, corresponds more or less closely with that observed by Landsteiner and Wiener among white Americans in New York city, *viz.*, 85% Rh positive and 15% Rh negative. On the other hand, there are marked racial differences in the Rh incidence among the coloured races. For instance, 89 to 90 per cent of the coloured population in the U.S.A. have been found to be Rh positive by Wiener *et al* (1944) and by Levine (1945). Wiener *et al* (1944a) found as high as 98·5% of Chinese were Rh positive and only 1·5% Rh negative. Among some nations Rh negative individuals are virtually absent. Simmons *et al* (1945) found 0·7% of Indonesians lacked the Rh factor while Miller *et al* (1945) found only 0·6% of the Japanese were Rh negative. Simmons and Gravdon (1945) encountered no Rh negatives among Filipinos tested by them.

The distribution of Rh factor among Indians has been studied by investigators in India and by Wiener and his collaborators in New York. Greval and Roy Chowdhury (1943) observed a 90% Rh positive incidence among Indians in Calcutta. In another series Greval *et al* (1946) found 7·8% were Rh negative and 92·2% Rh positive. In an enquiry into erythroblastosis fœtalis Greval (1945) employing anti-Rh serum produced by immunizing experimental animals in his laboratory, found 84·8% of antenatal women were Rh positive, 7·6% Rh negative while 7·6% were classified as "doubtful". The same worker has recorded in 1946 that 85·7% of antenatal women tested were Rh positive, 8·5% Rh negative and 5·7% "doubtful". Khanolkar and Sanghvi (1945) found 98% Rh positive in Bombay while Ranganathan *et al* (1946) found 95·9% Rh positive in Madras. Wiener *et al* (1945) observed 90·3% of Asian Indians resident in New York were Rh positive. Bird (1946) found the proportion of Rh positives to be higher than other investigators in India, *viz.*, 98·9% of 390 Indian soldiers "of all religions and castes, and belonging to all parts of India."

The frequency of Rh factor in the Indian population thus shows considerable variation, the frequency of Rh negatives varying from 2% in Bombay to 10% in Calcutta. One reason may be, as Wiener suggested, that "the Indian population is a complex of many racial types, including leucoderms, melanoderms and xanthoderms, kept segregated by both social customs and linguistic differences."

It was felt that the previous investigation in Madras was too small to be representative of the population of the province and that there was need for a more comprehensive study. The present paper records the results of an investigation carried out at the King Institute of Preventive Medicine, Guindy, Madras, through the kind courtesy of the Director. The investigation was made possible by the generous supply of anti-Rh serum by Dr. Joseph M. Hill (of Baylor University Hospital, Dallas, Texas) at the instance of Dr. Philip Levine, Raritan, N.J.

Method and Materials

Red cell suspensions—Samples of blood from an unselected population, mostly blood donors, were used for the tests. For convenience blood specimens collected at the time of blood donation for serological tests were utilized and were generally not more than 24 hours old. The cell suspensions were prepared by pouring off the clot and all but the last drop or two of the serum and shaking the sedimented red cells in the remaining serum. If the suspension was too thin (as judged by sight), the clot was shaken in the decanted serum which was then centrifuged after removal of the clot and some of the cell deposit was added to the cell suspension. No attempt was made to standardize the cell suspension, but care was taken to ensure that it was fairly thick (about the consistency of oxalated blood), and that the suspension was prepared in autologous serum and that no saline solution was used in the preparation.

Anti-Rh sera—Dried sera of the specificities anti-Rh_0 (anti-D), anti-Rh′ (anti-C) and anti-Hr (anti-c) were used. Anti-Rh″ (anti-E) serum was unfortunately not available.

Technique—As recommended at the International Hæmatology and Rh Conferance held in Dallas, Texas in November, 1946, Chown's capillary tube test (1944) was followed. A preliminary test with anti-Rh_0 serum alone of 27 bloods together with two known Rh negative controls showed a remarkable clarity of readings and a clear-cut differentiation between positive and negative reactions. No doubtful reactions were encountered. The great economy in testing serum was also an important consideration in favour of Chown's method.

Results—A total of 294 blood samples was tested. The results of the tests with anti-Rh_0 (anti-D) serum are shown in Table I together with the distribution among the communities. As already mentioned, a batch of 27 bloods was tested with anti-Rh_0 alone while the remaining 267 blood samples were tested with both antiRh_0 (anti-D) and anti-Rh′ (anti-C) sera and, in appropriate cases, with anti-Hr (anti-c) serum as well. The incidence of Rh-Hr types is shown in Table II.

Table I—Showing Incidence of Rh Factor in South India

	No. of persons tested	Rh_0 positive		Rh_0 positive	
		Number	Per cent	Number	Per cent
Hindus	222	206	92·8	16	7·2
Indian Christians ...	31	28	90·3	3	9·7
Anglo-Indians ...	21	16	76·2	5	23·8
Muslims	20	19	95·0	1	5·0
Total	294	269	91·5	25	8·5

Table II—Showing Incidence of Rh-Hr Types in South India

Test Sera					Hr test	
Anti-Rh_0 (Anti-D)	Anti-Rh_1 (Anti-C)	Rh type	Number	Per cent	Positive	Negative
+	−	Rh_0 (cDe)	5	1·8		
+	+	Rh_1 (CDe)	240	90·0	48·1%	51·9%
−	+	Rh′ (Cde)	6	2·2		
−	−	rh (cde)	16	6·0		
		Total	267	100·0		

Discussion

For routine Rh testing the use of anti-Rh_0 (anti-D) serum having 85% specificity or anti-Rh_1 (anti-CD) serum having 87% specificity has been recommended. It is suggested that of the two anti-sera the use of standard anti-D serum is better and for some reasons preferable to anti-CD serum. Firstly, anti-D is the commonest type of immune serum produced by the sensitized patients. Secondly, most of the work on the incidence of Rh factor throughout the world, at any rate during the early years, was done with serum of 85% specificity described by Levine and Stetson (1939) and the results have been published universally on that basis. Thirdly, even at the present day anti-Rh sera of specificities other than anti-Rh_0 are hard to obtain and so anti-Rh_0 serum alone is likely to be used until the rarer sera become available for general use. For these reasons, and in order that the results may be strictly compar-

able it is suggested that the results be expressed as Rh_0 positive and Rh_0 negative. The notation—which is not new—is self-explanatory and at once implies that anti-Rh_0 serum alone has been employed.

It will be seen from Table I that with anti-Rh_0 serum 269 out of 294 bloods or 91·5% are positive and 25 bloods or 8·5% are negative as compared with 85% and 15% respectively among the white population. It is noteworthy that 7·2% of Hindus who formed approximately three-fourths of the total number of persons tested lack the Rh factor. If the results with anti-Rh_1 (anti-CD) are considered, 94% are found positive and 6% negative (Table II). The difference in the specificities between the two sera, *viz.*, 2·5%, is within the limits of experimental error.

If anti-Rh″ (anti-E) serum is not used and only anti-Rh_0 and anti-Rh′ sera are used for Rh typing, certain errors in the figures are inevitable. For instance, type Rh″ (cdE) will be scored as rh (cde), Rh′Rh″ (CdE) as Rh′ (Cde), Rh_2 (cDE) as Rh_0 (cDe) and Rh_1Rh_2 (CDE) as Rh_1 (CDe). In view of the extreme rarity of type Rh′Rh″ (CdE) which has an incidence of 1 in 10,000, and the comparative rarity of Rh″ (cdE) which has a frequency of 1 : 200, it may be pointed out that even if anti-Rh″ serum had been used, the number of bloods containing Rh″ agglutinogen would not have appreciably altered the Rh negative percentage. The position, however, is different in the case of Rh positive figures because types Rh_2 (cDE) and Rh_1Rh_2 (CDE) form an appreciable proportion of the population. Wiener (1945) found 5·1% of Indians belonged to Rh_2 and 12·8% to type Rh_1Rh_2, while Greval (1946) found 2% belonged to Rh_2 and did not encounter any blood of type Rh_1Rh_2.

The Hr status of Rh_1 bloods was tested with anti-Hr serum and it was found that 48·1% were Hr positive and 51·9% were Hr negative. It has to be pointed out again that the Hr positives include not only the heterozygous Rh_1 bloods but also the bloods of type Rh_1Rh_2 which, in the absence of anti-Rh″ serum, have been classified as Rh_1.

In spite of these shortcomings, the findings are of interest from more than one point in view. Anthropologically, the moderate incidence of gene r (6·0%), the very high occurrence of R^1 and the low frequency of r^0 would suggest that the South Indian population is probably more closely related to the Caucasoid than to the Negroid or Mongoloid group.

The incidence of 8·5% of Rh_0 negatives is of special significance in clinical medicine. This figure is a little more than double the frequency observed at an earlier investigation by the authors. The present figure which is based on the examination of a larger series should be the more reliable one.

The incidence of erythroblastosis foetalis in any race, as Levine (1942) has shown, is directly proportional to the frequency of negative reactions with anti-Rh_0 serum. The incidence of the disease in South India should, in theory, be approximately one-half of that in Britain, *viz.*, one in 500 to 600 births. The larger average size of the family in India may tend to increase the frequency to some extent.

That cases of iso-immunization against the Rh factor do occur in India has already been shown. Greval (1946 and 1947) has recorded two presumptive cases of erythroblastosis fœtalis while one of us (K.S.R.) has recorded two typical cases of Rh iso-sensitization with one case of congenital hæmolytic disease after complete investigation. The baby which had been transfused with Rh negative blood is alive and well now. The authors are of opinion that only a systematic investigation of all cases of unexplained stillbirths, sudden neonatal deaths, neonatal jaundice, neonatal anæmia etc., can reveal the true incidence of the disease. Mere clinical impressions have been proved to be fallacious.

The senior author has shown in a previous communication elsewhere that it is possible to obtain presumptive evidence of iso-sensitization and to demonstrate the presence of atypical antibodies in the blood of the sensitized individual by applying some of the recent tests for Rh sensitization even in the absence of anti-Rh serum.

Lack of essential anti-Rh sera is holding up important studies in India. It is now recognized that the best source of anti-Rh serum is from iso-immunized individuals. The use of experimental anti-Rhesus serum prepared by injecting laboratory animals has therefore been abandoned wherever immune human serum has become available. The rapid advances in knowledge that have resulted from the enormous research on Rh factor in foreign countries have been made possible through the co-operation of the members of the profession. Every physician in charge of a case must recognize that he is under an obligation to render all possible help in providing a supply of serum. Will it be too much to ask the members of the Indian medical profession to extend such cooperation for furthering medical research? The senior author will be glad to render all assistance in the investigation of suspected cases that may be referred to him.

In conclusion, one feature that we noticed in the course of the investigation was the rarity of Rh_0 negatives on some days and the occurrence of a proportionately large number of them on certain other days. For example, not a single Rh_0 negative blood was encountered in two batches of 27 and 17 bloods respectively. The practical importance of the observation lies in the attention that it draws to the difficulty that may be experienced in obtaining at short notice a Rh negative donor of the right blood group for blood transfusion. The need for organizing Rh negative donor panels will at once be obvious.

Summary

1. A study of the Rh status of 294 individuals in South India has shown 91·5% to be Rh_0 positive and 8·5% Rh_0 negative.

2. The clinical importance of the finding is discussed.

3. A plea is made for the cooperation of physicians to ensure a supply of immune anti-Rh serum.

4. Attention is drawn to the imperative need for organizing Rh negative donor panels.

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SOME RECENT DEVELOPMENTS IN NEW FOODS AND TREATMENT OF MALNUTRITION

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In recent years investigations in the field of food and nutrition have brought to light the important uses and applications of new food products in treatment of malnutrition. The war exerted great stimulus to researches on food with a view to exploring new food products. It has been well said "If necessity is the mother of invention, probably war is the father of research". Nowhere else is this true than in problems relating to the war time food supply and to meet the nutritional needs of the population as a whole. The same state of affairs exists in the post-war world.

It is not intended to present a complete survey of the recent contributions made in the field of food and nutrition, but rather to select some high lights of the important developments which have influenced the knowledge of the uses and applications of protein foods and vitamin enriched products in human nutrition.

During the past three years we have been engaged in these two important lines of investigation on foods, and the results so far achieved have been of considerable importance from the point of view of their application to human nutrition and it was felt, therefore, that a discussion on the uses and applications of these products in medical practice would be timely and appropriate at the present moment of food shortage and widespread famine conditions in India.

The discussion will therefore centre chiefly on these two aspects of food and nutrition, namely the value of predigested protein foods and vitamin enriched products in human nutrition. No attempt is made to give anything more than a comprehensive summary of only those data including our own experiments which appear to me to be relevent to the protein and vitamin B_1 deficiency in India.

Predigested Protein Foods in Human Nutrition

One of the most serious nutritional problems in India is the deficiency of proteins of high biological value in our diet. Proteins and aminoacids are intimately related to the structure, growth and the life of every cell. Protein deficiency in the diet does not manifest itself in symptoms of disease easily detected by the clinician as in case of vitamin deficiencies, but the function of all tissues fail together. The effects of protein deficiency are much more deep seated resulting in racial characteristics

such as retarded growth, lowered vitality, poor muscular efficiency etc.

The solution of the problem of protein deficiency in India is of immediate importance and much more difficult than the vitamin deficiency. In the case of vitamins, we have a wide variety of natural food stuffs which can supply to a certain extent the requirement of vitamins, provided some attention is paid to the proper selection of food materials. In addition, as synthetic preparations of vitamins are available in plenty and the vitamin requirements so small that there are no practical difficulties encountered in meeting vitamin requirements of the population, provided the vitamins are made available in a form which can be readily consumed by all classes of people. On the other hand, proteins of high biological value can only be obtained from animal products, such as meat, milk, eggs, etc., which are very scarce at the present moment. Unless an allround developments in livestock breeding, raising of fodder crops, fish industry are made, it is not possible to supply the required amount of protein of high biological value.

In recent years, the nutritive value of predigested protein foods is attracting widespread interest among nutritionists. In view of the present scarcity of good sources of protein such as, meat, eggs, and milk, consideration must be given to the value of other protein foods to feed the population and specially for rapidly restoring the badly undernourished millions at the present moment of food crisis. It is a well known fact that sufficient protein must be taken along with our food in order to meet the normal requirements of the body to maintain proper health. The ingested protein must be broken down by hydrolysis in the digestive tract before it can be absorbed through the gut. The physical condition of a food may however, prevent the digestive juice from penetrating the proteins thereby preventing the breakdown of the food proteins. Proteins escape absorption in various foods depending on the nature of the protein and the physical state in which it occurs in the foodstuff. If, therefore, the proteins are broken down by enzymes outside the body, it would be more completely utilised. The products of hydrolysis of proteins are more easily assimilable than unhydrolysed proteins. Further, it is known that certain amino-acids and peptides act as co-enzymes for proteolytic enzymes which are responsible for the digestion of proteins. Thus, if the protein contains hydrolysis products also, *i.e.*, amino-acide and peptides, these digestion products activate the enzymes thereby augmenting the digestive capacity of the juices. In fact, amino-acids are necessary for certain enzymatic reactions to take place. These would provide ample evidence to indicate the importance of such predigested protein concentrates in human nutrition.

In cases of starvation due to present food scarcity, insufficient food is available not only to meet the normal requirement, but also to replace the body reserves which are so depleted as to adversely affect the proper functioning of the digestive enzymes. This extreme state of disturbance in normal digestion and metabolism leads to diarrhoea and subsequent death. It is now claimed by many workers that treatment with predigested protein food results in a dramatic improvement in health. In addition to its value in the treatment of cases of starvation, it has proved a valuable food for premature infants and children with digestive disorders and in the treatment of stomach ulcers. It is also invaluable as an easily assimable protein food for infants, invalids and as a general protein suuplement for even normal persons.

Treatment of Malnutrition

A form of predigested food known as 'F-Food' or famine food containing amino-acids, glucose and vitamins has been used in feeding the starving population of the liberated European countries. Recently, protein hydrolysate products prepared from edible meat was used in the treatment of extreme cases of starvation in Bengal Famine of 1943, where even intravenous glucose administration was of no use (Mukherji, 1945).

Protein hydrolysate as supplementary food for premature and undernourished infants—Preparations of hydrolysed casein are now being used for the feeding of premature or undernourished children. Although human milk is superior to all other foods for growing children it is not the ideal nourishment of infants who have begun their extreme uterine life too early. Further, the high calory requirements of these infants together with the lack of proper functioning of their digestive organs make it necessary to supplement breast milk which on account of its low calorific value places a high demand on the digestive organs—with other foods which are easily assimilable and rich in protein. Recently, highly significant results have been obtained by the use of amino acid mixtures as additional food for premature infants (J. H. Magnusson, 1944, Jorpes, Magnusson and Wretlind, 1946). A mixture of amino acids obtained by enzymatic digestion of casein mixed with glucose to supply calories and salt mixture to meet the salt requirements is found to be the ideal food for premature infants. A comparative study of the increase in weight of infants by feeding undigested casein on the one hand and a mixture of free amino-acids and polypeptides containing all the amino-acid found in casein on the other has shown that the gain in weight was considerably greater when amino acids mixture was being administered. The preparation used in these studies had the following composition :—

Amino acid mixture	...	...	25 %
Glucose	...	...	25 %
Salt mixture	...	...	1·5%

The mixture was given through a catheter along with breast milk during first few days of life and

later fed by mouth. The amino acids were found to be completely assimilated. The preparations are stated to be well tolerated by infants without any complications such as vomiting or digestive disturbances. The daily dose was about 2·5 g of amino acids per kilogramme of body weight together with an equal amount of glucose.

'Protein hydrolysate' preparations—Predigested foods consisting of 'Protein Hydrolysates' are now being manufactured by a number of pharmaceutical firms in America. A brief description of these products with their methods of preparation may be of interest.

The preparations as at present used are of two kinds: (1) A solution of amino-acids prepared by acid digestion or enzymic digestion of protein, particularly caseir for intravenous use and (2) Preparation obtained by digesting protein (casein or meat) with enzymes, which contains amino acids, peptides and also peptones and albuminoses for oral use. These preparations are frequently used admixed with glucose and vitamins in feeding the starving population of some of the liberated European countries.

The disadvantages of acid digestion process is that tryptophane is destroyed during the process, and therefore it should be replaced by adding tryptophane to the final product. On the other hand, in the enzymic digestion process the tryptophane remains intact. It has been observed by several workers (Holt *et al*, 1941: Cox *et al*, 1942) that the nitrogen equilibrium was readily maintained on an enzymic hydrolysate of casein, while it was not obtained with an acid hydrolysate of casein (which is deficient in tryptophane) until tryptophane has been added. The predigested food which is otherwise known as 'F-Food' which has been in use in Europe, is a mixture of amino-acids, glucose and vitamins. It is stated that two litres of the product is equivalent to about 50 grammes of protein which is injected daily.

Other types of preparations which are intended for oral administration consist of spray-dried solid material obtained by digesting casein or meat, with enzymes. These preparations contain mixtures of amino acids, peptides and peptones. Vitamins can be added to this powder. It is generally administered by mouth or by stomach tube.

Preparations used during the last Bengal famine of 1943—The preparation of protein hydrolysate product form edible meat rich in amino-acids has been described by Mukherji (1945). This preparation was used during the last Bengal famine of 1943 for treatment of cases of starvation. Highly successful results were obtained in the treatment during the famine period. In view of its valuable therapeutic properties and its regular use by the medical profession, the author has described certain set of standards to be followed by all pharmaceutical concerns taking up the manufacture of this product, and a tentative monograph on the subject drawn up in accordance with the B.P. is given. This preparation is intended for intravenous administration. The method of preparation is described.

New sources of food protein—The protein hydrolysates described above are generally prepared from casein or meat. In view of the present scarcity of animal products, it is necessary to find adequate alternatives. Increased interest has recently developed in the nutritive value of plant proteins which may practically replace or substitute proteins of animal origin. Various oil bearing seeds can be used as a source of food protein after extraction of the oil. Groundnut, sesame and cocoanut are useful from this point of view. Standard predigested protein foods can be prepared from these oil seed cakes for human consumption.

Groundnut which is rich in high class protein is an excellent source of protein for removing the protein deficiency at the present moment. In addition, groundnut is a rich store house of vitamins, particularly vitamin B_1 and nicotinic acid. At present, the cake after removing the oil by mechanical expression is used largely as manure and as a source of protein in live-stock feeds. The utilisation of this protein rich by-product of the groundnut oil industry as food material has not been feasible, because it is lacking in certain qualities to be used as food material for human beings. Groundnut as a whole is known by common experience to be poorly digested in the human system. This is partly due to the fact that nut meats are not broken into small enough particles in the process of chewing. If we are to take full advantage of this important protein food during this period of food shortage, it probably will be necessary to find out suitable methods of processing the cake with a view to making it more palatable and digestible to adapt it for general human consumption. A process has been developed in these laboratories for the preparation of predigested food from groundnut cake. The process consists in suitably treating the groundnut cake powder by enzymes, such as papain and concentrating the product to a suitable consistency. This method of obtaining the predigested protein food results in a product containing the bulk of protein, vitamins and minerals originally present in the cake. The product is palatable and thus aids in its general acceptance. The residual material obtained after extraction of the digestive protein, contains some quantity of undigested protein, carbohydrates and minerals which could be used as a stock feed after suitable drying.

The present protein requirements of the nation can be met from a new angle, and the proportion of the proteins in the food can be increased by the addition to the diet of such predigested protein foods. This food can be supplied to the starving population of our country. Further, the products prepared from groundnut according to the process, in several respects resemble yeast extracts such as marmite. In the following table are presented the results of the chemical analysis of the products obtained from

groundnut compared with those obtained from marmite and other yeast extracts :—

Constituents	Predigested protein food from groundnut cake	Marmite	Other yeast extracts
1. Water	25·7%	26·84[1]	...
2. Total nitrogenous extractives ..	60·8	34·67[1]	27-43
3. Peptones and aminoacids ..	14·4	10·50[1]	...
4. Ether extractives	0·24	...	...
5. Phosphorus ..	0·336	...	...
6. Calcium	0·068	...	...
7. Iron	0·0064	...	...
8. Vitamin B_1 ..	260-330 I.U. per 100 gm.	200 I.U.[2] per 100 gm.	160-440[4] I.U./100 gm.
9. Nicotinic acid ..	290 mg/gm.	640 mg/gm[3]	285-470 mg[5] per gm.
10. Riboflavin ..	...	6 mg/100 gm[1]	

[1] Hutchin's food and principles of Dietetics (1941).
[2] Leong (1940).
[3] Kodicek (1940).
[4] Harris and Wang (1941).
[5] K. Bhagvat (1943).

The analysis shows that it contains 55-60 per cent of proteins and their breakdown products, and 4 teaspoonsful (drachms) will contain about 6 grammes of proteins, which is about the same amount of protein present in one egg or 1 oz. of meat.

These predigested protein concentrates from groundnut cake offer a good substitute for meat and meat products. Experiments with other edible seed cakes have shown that they could be processed in the same way as groundnut cake to yield quite palatable concentrated digests which are easily assimilated. Sesame cake has the additional attraction that it is naturally rich in calcium. Cottonseed hydrolysate is also a pleasing product with a good taste and flavour. A suitable mixture of groundnut, cottonseed and sesame flour, predigested and concentrated would certainly turn out to be a first class article of food. The present acute food shortage in the country and the pressing needs by the masses for an increased quantity and quality of human food demand that this source of abundant and protein-rich food be utilised.

Vitamin Enriched Food Products

Another most serious nutritional faults in India is the deficiency of vitamin B_1 in our diet. A large proportion of the total food calories is taken in the form of refined foods such as rice which contains very little vitamin B_1. The vitamin B_1 deficiency will be further aggravated by the failure of cereal crops and acute shortage of food grains and the consequent reduction in cereal ration. The health and efficiency of the nation are considerably impaired as a result of the deficiency of B vitamins in the diet. Diseases associated with vitamin B_1 deficiency will be on the increase unless immediate action is taken to combat the deficiency.

Some practical measures to combat the vitamin B_1 deficiency in India have been suggested from time to time. These include (1) Undermilling of rice, (2) Consumption of parboiled or "converted rice", (3) Artificial enrichment of rice with vitamins, (4) Incorporation of the vitamin in the salt supply and (5) Distribution of vitamin tablets. It is doubtful that undermilling can be relied on to improve the nutritive quality of rice owing to lack of proper and easy methods of controlling the degree of undermilling and the bad storage quality of the undermilled rice. Further, the public as a whole seem to prefer white rice. Parboiled rice which is favoured in certain parts of India, is viewed with distavour by a large section of people in India. The unhygienic methods adopted in its preparation, the disagreeable smell and religious sentiments have stood in the way of its introduction throughout the country. "Converted rice" which is a dignified form of parboiled rice, prepared by an improved and mechanised modification of parboiling process may not find much favour, as the small nutritional advantages gained by the consumption of this rice may not justify the cost of efforts needed to introduce such intricate technical process in India. Fortification of the vitamin in salt was found to have no special advantage as the vitamin is not stable in the salt under tropical conditions. Distribution of vitamin tablets is now being practised in all countries. Whilst it may be predicted that the distribution of vitamin tablets will tend to improve the nutritional status of the population, nevertheless it will be difficult to persuade everyone, particularly school children in rural areas, to consume vitamins as drugs in the form of tablets which may not be taken as readily as groundnut or similar natural food materials which are quite familiar to them if they are enriched with vitamins. It is difficult for one to consume everyday some tablets which are considered by most people as medicine. In view of the various limitations of the above measures suggested to increase the vitamin B_1 intake of the population, it seems desirable to explore other possibilities of making available vitamin B_1 to all classes of people in the country.

Since better nutritional welfare is closely linked with economic circumstances and food habits it follows that for effective and widespread dietary improvement some of our cheap and easily available foodstuffs should be improved in nutritive quality to such an extent as to meet in full the daily requirement of food essentials. One of the objects of nutritional policy should be to depend on natural foodstuffs and as far as possible on foodstuffs produced locally for improving the diet. With this object in view, our attention was focussed on groundnut which is an economical and easily available nutritious food material, with a view to enrich it with more vitamin B_1 and our efforts to produce groundnut containing enough vitamin B_1 to meet the daily requirements of man when consumed in very small quantities (10 to 20 grams) have met with remarkable success. A process

for enriching groundnut with vitamin B_1 has recently been invented by the author[1] which can be immediately adapted to large scale production without much effort and cost. The enriched groundnut is found to be more palatable and attractive than the unprocessed kernel. It contains about 50-120 micrograms of vitamin B_1 per gram of kernel. Products having uniform potency can be obtained by standardisation of the process. The product is thus superior to some of the yeast preparations in its vitamin content. Consumption of 10-20 grams of the enriched groundnut kernel per day would meet the daily requirement of the vitamin.

It is important to have available at this time, ample and low cost sources of protein and vitamin B_1 and the enriched groundnut is the most logical food to fill this need. Such articles of food will receive widespread and permanent acceptance. The high nutritive value of enriched groundnut, its cheapness, its unlimited availability call for attention to this new product and for active propaganda regarding the merits of this product. The enriched groundnut should be particularly easy to introduce into the diet of the people, specially to school children. Increased use of this product will greatly improve the diet and will result in better growth and general improvement in health and well-being of a large section of the population, particularly the poorer class of people in India. It would seem that this is the most economic and feasible method of eradication of beriberi and combating vitamin B_1 deficiency in India over any other forms of nutritional improvements such as the introduction of "converted rice", artificially enriched rice, vitamin tablets and other measures suggested from time to time in India. The advantages to be gained in national health would make it well worth while to popularise the product and educate the public in regard to its high nutritive quality.

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[1] A patent application for this process was filed in May, 1946. Patent application No. 35069.

THE EVALUATION OF PNEUMOPERITONEUM IN THE TREATMENT OF TUBERCULOSIS

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History

To delve briefly into the history of pneumoperitoneum, before Vajda in 1933 propounded this as one of the lines of treatment in pulmonary tuberculosis in man, experiments had been performed in dogs showing that pneumoperitoneum caused the elevation of the diaphragm. Shortly after followed the works of Banyai, Trimble and Wardrip, and to this treatment was now supplemented phrenic paralysis. Now after the pendulum has swung from success to failure and back, we are in a position to evaluate the results of its use in the treatment of tuberculosis.

Pneumoperitoneum is used in the treatment of pulmonary and abdominal tuberculosis.

Abdominal Tuberculosis

In tuberculosis of the small intestine when ulceration is mild, pneumoperitoneum does good in that it allays pain and diarrhoea, and improves appetite. Once the ulcerative stage has advanced, nothing can check its progress and pneumoperitoneum is of no avail.

When there is matting of the small gut it is futile even dangerous to induce pneumoperitoneum as such cases always prove a failure, for the end is only a question of time.

In the large intestine when the lesion is ulcerative, the small intestine is usually involved and the results are disappointing. In the "ileo-caecal tumor" variety the best line of treatment is a 'short circuit' followed by removal of the diseased gut. Pneumoperitoneum has no effect on either the extent or progress of the disease.

Where the peritoneum is involved with miliary studding, caseation or fibrosis, the results are uniformly poor. We had two cases of ileo-caecal tuberculosis where laparotomy had been performed and the abdomen closed due to severe matting. Pain was the outstanding symptom. We thought that if the peritoneal surfaces could be kept apart by pneumoperitoneum, pain would subside, but the condition grew worse. Such cases evoke the greatest pity, as nothing can be done for them.

In plastic peritonitis it would be dangerous. In the ascitic variety we have not had much experience.

In glandular involvement with tabes mesenterica the results are poor.

In involvement of other viscera, pneumoperitoneum is not indicated.

So far we have had two cases where peritoneal irritation due to peritonitis was so great that, the mere introduction of the needle during pneumoperi-

toneum produced violent abdominal muscular cramps. The same story was repeated on the second occasion. When a case has marked resistance of his abdominal muscles due to underlying peritonitis, one may expect this type of complication ; pneumoperitoneum should not be induced in such cases.

In short may we say that the story of pneumoperitoneum in abdominal tuberculosis is a very sad tale. It is of value only in the ulcerative stage with vague pains, anorexia and mild diarrhoea.

Pulmonary Tuberculosis

Pneumoperitoneum is tried alone, in combination wtih A.P., phrenemphraxis, or lastly to aid the rise of the diaphragm.

(1) It is *tried alone* in bilateral cases which are either too far advanced anatomically and clinically for bilateral A.P.

(2) In *combination with A.P.* to bring about the rise of the diaphragm, thus further relaxing the lung and in bringing about the obliteration of cavities held open by adhesions which cannot be dealt with by internal pneumolysis.

(3) It is *combined with pherenemphraxis* when (a) this is used as a primary procedure for basal productive infiltration which will respond to this type of treatment: (b) in unilateral cases where A.P. has failed and the lesion is too acute for thoracoplasty. Here pneumoperitoneum brings about a change in the character of the lesion—the exudative element disappears—and the condition becomes fit for further interference. (c) In bilateral cases, one side is under A.P., the other having a small productive lesion, with or without a cavity Type I, II, or III. Pneumoperitoneum with phrenemphraxis on this side brings the disease under control. Failing bilateral A.P. could be instituted. If the disease is exudative and the cavities advanced or the patient a diabetic A.P. should always be induced first. In diabetic cases pneumoperitoneum has no effect as the lesion is exudative with a tendency to rapid spread.

(4) Lastly, to aid the rise of the diaphragm in unilateral cases under A.P. where a cavity is held patent by adhesions, phrenemphraxis is done within a month of the induction of A.P. If the rise is not satisfactory, pneumoperitoneum is instituted within 2 weeks of the phrenemphraxis. This enhances the rise bringing about the obliteration of the cavity. In unilateral cases with haemoptysis where A.P. has failed to check the flow, phrenemphraxis combined with pneumoperitoneum has brought about its disappearance. The bleeding comes from a cavity held open by adhesions. Internal pneumolysis cannot be done as the A.P. has just been instituted and in such cases phrenemphraxis with pneumoperitoneum has served well. It is useless attempting to force the diaphragm up with pneumoperitoneum alone when it is not paralysed. It will never go up. Pneumoperitoneum can only be done after the A.P. has been in progress for 2 to 3 months, and a sufficient space made available.

Best results of phrenemphraxis are obtained when it is instituted within a month of the induction of A.P. where adhesions are keeping the cavity patent. Every day in the life of a cavity counts, for its walls get further and further fibrosed and offer greater resistance to all types of collapse therapy. Waiting, praying and hoping to get results is the worst line of treatment in tuberculosis.

Tuberculosis is a disease that must be tackled very early, drastically and by combinations of various collapse measures.

Physiological Effects of Pneumoperitonium

By its cushioning effect under the diaphragm it elevates it and relaxes the lung, thus decreasing its excursions and giving it rest. This effect is enhanced when the diaphragm is paralysed. When the diaphragm is not paralysed, the excursions are diminished on very shallow breathing, but return to normal when the breathing is deep. The higher the rise of the diaphragm, the greater the relaxation of the lung, the better will be the results.

In order to raise the diaphragm various methods have been tried, but to no avail.

(*a*) Binders have been applied to the abdomen.
(*b*) The patient made to lie on his face with pillows under the abdomen.
(*c*) Patient is made to sit up for hours.

In order to understand the mechanism of rise, one should observe the patient under the screen. In the standing position there is an apparent rise because of the marked distance between the diaphragm and liver on one side and the spleen and stomach on the other. This apparent rise is false, for if the level of the ribs are taken as a guide, one finds the level to be in the same original position prior to the induction of neumoperitoneum. The only effect of the air has been to displace the viscera downwards. Note the level of the diaphragm counting it against the anterior ends of the ribs. Say it is opposite the anterior end of the 5th. Tilt the patient backwards and as he inclines from 90 to 45° 'the air is still beneath the diaphragm, the level remaining the same. From the 45° tilt to the horizontal position the air gradually disappears and totally vanishes when the horizontal position is reached. The liver spleen and stomach are now in contact with the under surface of the diaphragm. What about the position of the diaphragm? It has not changed at all. It is still opposite the anterior end of the 5th rib. This clearly indicates that it is not the sitting posture that causes the rise nor aids it. Next, in the lying position we have applied tight binders to the abdomen enough to cause discomfort, but without any change in position. Binding the abdomen embarrasses respiration forcing the patient to breath deeper, thus frustrating the very principles of treatment. The patient has been placed on his abdomen with pillows beneath, but to no effect. In order to investigate the cause of rise, one has to study the physiological relations that exist on either side of this partition. A normal

diaphragm has tone and will resist all displacement. This is obviously seen in the paralysed diaphragm where the rise is highest. The function of the diaphragm is to move down during inspiration by active contraction, thus increasing the negative pressure in the chest and aiding the downward movement of the lung. During expiration the diaphragm moves up as the muscle relaxes. In a severe bout of coughing or straining, the intra-abdominal pressure rises so high that the diaphragm would be blown up had it not been for the inherent resistance offered by the muscle tone. During inspiration following phrenemphraxis, the normal leaf descends, the intra-abdominal pressure rises and it manifests itself on the paralysed side by raising it. The paralysed side now performs paradoxical movements. The abdominal cavity is bounded by 2 moveable walls—the anterior abdominal wall and the diaphragm. The intra-abdominal pressure is maintained by the tone of these two muscles. The position of the viscera is maintained by this intra-abdominal pressure. When air is introduced into the abdomen it fills the coelomic space. During inspiration the intra-abdominal pressure rises and exerts force on all structures. The abdominal wall moves outwards. This movement is restricted by the tone of the muscle. The pressure continues to rise. As no structure will yield so readily as the paralysed diaphragm, it moves up. If the patient is sitting, this force acts through the cushion of air beneath the diaphragm, but if he be lying, it is transmitted through the liver, the air now being beneath the anterior abdominal wall. Expiration sets in. Where this is powerful, the intra-abdominal pressure rises still higher and pushes the paralysed leaf up.

It is constant pressure both during inspiration and expiration, further enhanced by coughing and straining that accounts for the rise of the diaphragm.

When pneumoperitoneum is induced the intra-abdominal pressure is round about +2 to +4. When the treatment has been in progress for quite a length of time the manometeric pressure manifested is about +8 to +10 or at the most +12. Even when 1000 c.c. refills are given this pressure remains about +10. The change in pressure is not great as the coelomic space is vast and adapts itself to the introduced air. Where the diaphragm is not paralysed, its rise is very poor—no matter how much air is introduced, or whether the patient is made to sit up for hours, or is fixed in a straight jacket—as explained by its inherent tone.

We have seen the best results in cases where the diaphragm is paralysed, the rise good, and the disease productive—with cavities type I, II or III.

Causes that prevent the rise of the diaphragm:

(*a*) When the diaphragm is not paralysed.
(*b*) When it is fixed by old pleural adhesions.
(*c*) When the liver is adherent to the under-surface of the diaphragm, thus anchoring it.
(*d*) In A.P. with massive pleural effusion.
(*e*) Where the base of the lung is adherent to the chest wall.

Complication of Pneumoperitoneum

(*a*) The commonest is extraperitoneal introduction of air. The air passes beneath the rectus muscle, creeping up to the hypochondriac region, or passing below enters the inguinal canal to seek its way into the scrotum. It manifests its presence by a crepitant feel and pain: if it passes below, by a hernial lump with a tympanitic note on percussion. The pain lasts for a day or two.

(*b*) The passage of the needle through the abdominal wall during induction may touch an intercostal nerve with severe pain of rare occurrence.

(*c*) If there is a congenital patency of the tunica vaginalis, the patient may develop an inguino-scrotal swelling. We have so far not seen any case develop a true hernia.

(*d*) Cardiac palpitation, where the left leaf is paralysed, by pressing on the heart.

(*e*) When there is a marked resistance of the rectus indicating peritonitis, the passage of the needle through the peritoneum may cause severe abdominal cramps. Pneumoperitoneum aggravates pain in such cases, and must be discontinued.

(*f*) Peritoneal shock.

(*g*) In cases with mild peritonitis, the patient develops ascites. In a few, the fluid has been found localised. Such cases always possess a far advanced lesion in the lung with abdominal involvement. Discontinuation of treatment with diuretics is all that is needed to clear up this complication. After the disappearance of the fluid, we once restarted pneumoperitoneum. Ascites developed once again, but disappeared on discontinuation.

(*h*) The commonest complaint is gastric upset. Every patient is an entity unto himself. Some can take 1000 c.c. with no ill effects, while others are put out with 600 c.c. We have never come across any case that developed gastric upset with 500 c.c. Loss of appetite is the main complaint. Before induction the patient felt voraciously hungry, awaiting eagerly his meal time, but now the very sight of food upsets him. This brings on a set back, for he loses weight and that in itself acts physically and psychologically. *This can easily be corrected by reducing the amount of refill, but never by prolonging the interval between refills.* In some, in spite of reducing the amount of air the patient never regains his normal appetite. In the days of Napoleon it was said that the army moved on its stomach. To day the army moves on petrol, but since the dawn of tuberculosis it still exists that a patient only moves on his stomach. Healthy appetite with vitality means winning half the battle and where vitality is lacking, treatment is of no avail. In every case once the 500 c.c. level is reached, we increase the amount of air very gradually and reduce it at the first sign of a failing appetite. The patient is always informed previously to report on the first signs of a starting anorexia. In order to avoid this complication, we give weekly refills and hardly go beyond 800 c.c., unless the patient is very well built and can stand it.

(*i*) The bogey of an intestinal puncture is the rarest of complications. We have not met with it

so far in spite of having attempted cases with peritoneal adhesions—who had been operated for tubercular caecum and the abdomen closed due to severe adhesions and cases with abdominal lumps of intestinal matting with mild obstruction.

The explanation of gastric upset is displacement of the stomach with sympathetic irritation leading to diminished gastric secretion, motility and pyloric spasm.

Technique

The patient takes a bath on the morning of the induction, the abdominal wall being previously shaved. Has a cup of tea for breakfast. Immediately before induction he is asked to evacuate his bladder. The bed is reaised at its head end by placing wooden blocks 9″ to 1 foot high, to allow air to rise beneath the diaphragm and thus give a resonant note over the dull liver area. The patient now lies near the edge of the bed without a pillow under his head, for when the head is raised, the abdominal muscles are taut and the manometer shows a higher reading. The A.P. apparatus is placed at the head end, and the operator sits facing the patient and the apparatus. Manometeric and facial changes give the best guide to a mishap. The patient loosens his waist band, and the abdomen is bared. The liver area is percussed in the mid-axillary line and the dull note observed. Never percuss in the anterior axillary line as the colon presents its resonant note. The area chosen is a triangle drawn by the lower border of the ribs, the middle line and a line drawn from the navel to the tip of the 10th. rib. The right side is always chosen. (*a*) When the patient is asked to raise his head before the needle enters the peritoneal cavity, this part of the abdominal wall rises away from the fixed viscera like the hood of a tent. Thus a space is produced into which the needle can safely be thrust without injury to the underlying viscera—the colon and the liver. (*b*) On the left side the stomach is a moveable structure, and (*c*) below the umbilicus there is no tenting. If by any chance the intestines are adherent, the needle penetrating the gut will produce at the most an abdominal abcess with its complications—the peritoneal cavity being saved. A point 2 to 3 inches below the margin of the ribs and one inch away from the middle line is chosen. The area is sterilised with rectified spirit. No. 1. Record Needle is fitted to a syringe containing 3 c.c. of a 1 to 2% Novocain solution. The needle is thrust rapidly through the skin, and the subcutaneous area infiltrated. Wait for 2 min. to allow the novocain to act, for it will give confidence to the patient, as he will feel no pain. Push the needle through the rectus muscle. This can be felt in most cases, except where the patient is abnormally fat. This sensitivity of touch comes through experience. When the needle passes through and lies above the posterior rectus sheath, there is a feeling of "giving way" as compared to the resistance offered by the muscle. Inject novocain into this space, and wait for two min. The peritoneum will now be anesthetised. At this step if after pushing in 1 to 2 c.c. novocain the piston is withdrawn. The patient feels pain at 2 stages of this technique. The first as the needle enters the skin (the pain is not severe) and the second when the needle touches the posterior rectus sheath. The character of this pain is different from the former and the patient winces and can guide the operator at this step. For a beginner I would advise going through the following steps: Remove the syringe and introduce the large A.P. needle up to the posterior rectus sheath. Now raise the level of the fluid in the A.P. bottles, so that when air enters it does so under pressure. Open the cork and allow the air to pass in. The air entering this localised space distends it. Allow 25 c.c. of air to enter and close the cork. The manometer will now register +16 to +20 cm. pressure. Ask the patient to raise his head and thrust the needle through. As it enters the coelomic space, there will be a sudden drop in the manometeric reading, since the intra-abdominal pressure is about +2 to +4 cm. This drop must be sudden and not gradual. Open the cork once again. The air rushes into the peritoneal cavity and will register the pressure due to the difference of the fluid levels in the two bottles. Say it is about +15. Close the cork and immediately the column of fluid in the manometer will drop to +2. This sudden drop is the best criterion of the needle being in the coelomic cavity. Once experience is attained and the finger speaks of the needle being above the posterior sheath, this step is dropped and the following step is gone through. Leave the needle in place and remove the syringe. Throw away the novocain. Fill the syringe with air and attach it to the needle. Ask the patient to raise his head and thrust the needle through the posterior sheath. The moment it enters the cavity the piston will smoothly fall, driving the air in. The weight of the piston is far greater than the intra-abdominal pressure. We always use an old syringe, for then the piston is loose in the barrel and slides down readily. When pneumoperitoneum has been in progress for quite a length of time there is a cushion of air beneath the anterior abdominal wall. If the piston is withdrawn once the needle enters the coelomic space, bubbles of air will rush into the syringe. On removing the syringe the air within the cavity escapes through the needle giving a bubbling note—as there is a drop of novocain remaining in the needle. Remove the syringe and attach the adapter to the needle. Raise the level of the fluid in the A.P. apparatus. Open the cork and let the air flow in. The reading shows round about +12 to +15. Close the cork and observe the manometeric limb drop suddenly to +2 to +4. This *drop must be sudden and not gradual.* If the fluid drops slowly, then the needle is outside the coelomic cavity ; or the needle is within and blocked by omentum or gut coming into contact. Withdraw the needle a little and observe the manometeric responce. If the response is still poor, ask the patient to raise his head once again and this time push the needle in a little deeper.

On the first occasion we never give more than 150 c.c. to 200 c.c. A refill is given after 2 days

increasing the amount to 250 c.c.'s. The next refill is given after another 3 days increasing to 400 c.c.'s. The next follows after 5 days, going up to 500 c.c.'s. Refills are now given weekly and the 500 c.c. mark is exceeded very slowly. If the patient develops anorexia, the quantity of air is immediately diminished. We increase the interval beyond a week only when the x-ray shows that the air is not absorbed within this interval. We go up to 10 days but never more. We have had very good rise with 600 & 700 c.c.'s, and when the diaphragm is not paralysed going beyond 1000 c.c.'s will be of no avail. It is no good allowing the air to be totally absorbed and then injecting in once again. Over here the routine is never to go beyond a weeks interval and rarely over 800 c.c. of air.

When air enters the abdomen it will rise to the sub-diaphragmatic area, there being wooden blocks at the head end. On percussion the dull note will give way to resonance. The patient will complain of pain over the shoulders specially when sitting or standing after the first two introductions of air. When the first induction of air is over, the blocks are removed so as to displace air from beneath the diaphragm to beneath the anterior abdominal wall which is less sensitive. If the patient still complains of severe pain, the blocks are placed at the foot end of the bed so as to force the air into the pelvis. *This relieves pain completely.* We always inform patients before induction that they will feel pain in the shoulders and that they should not worry, but to rest assured that the induction has been successful. Rarely one has to resort to morphia. An analgesic powder is given to be taken after the induction and at night. The patient lies comfortably after the induction with a pillow beneath his head. Except sips of water, he receives nothing by mouth till 4 P.M., when he receives a glass of milk and at night his usual dinner. This precaution is taken only at the primary induction.

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SPECIAL ARTICLE

GOVERNMENT OF INDIA, DEPARTMENT OF HEALTH

COMMITTEE OF INDIGENOUS SYSTEMS OF MEDICINE

QUESTIONNAIRE III WITH ANSWERS FROM THE I.M.A. SUB-COMMITTEE

QUESTIONS	ANSWERS
1. What are the characteristics of the indigenous systems which specially commend them to the people?	(*a*) Easy availability of practitioners of these of systems. (*b*) Absence of facilities for better and scientific medical relief. (*c*) Faith in their efficacy and familiarity with the systems from time immemorial. (*d*) The belief that they are cheaper. (*e*) The belief that Indian Systems are best suited to Indian constitution. (*f*) The promise of cure held by their practitioners in almost every disease. (*g*) The halo of religious sanctity. (*h*) Emotional nationalistic political enthusiasm which is naturally pro-Indian and anti-Western in spirit and outlook, with revivalistic tendencies.
2. What are the special features of the indigenous systems which give them a distinctive and pre-eminent value from the point of view of the health of this community?	None whatsoever. Far from there being any distinctive and special features of the indigenous systems which would give them a pre-eminent value from the point of view of the health of the community, the indigenous systems suffer from many drawbacks particularly the absence of any specialised branches to deal with public health or preventive medicine. In fact, these systems, as they stand to-day are individualistic in their approach directed towards the cure of diseases and not to the prevention of them. Speaking historically, preventive medicine is of recent origin, which evolved *pari passu* with the development of bacteriology and immunology.

Questions	Answers
3. Any special research on indigenous systems which you have carried out. Please supply copies of your research publication?	Some members of the scientific system of medicine (wrongly called Allopathic System) *e.g.* have investigated a number of theories and drugs mentioned in the Indigenous Systems. Whilist basic theories have not been substantiated some of the drugs found efficacious have been accepted and incorporated in the modern pharmacopoeias.
4. In addition to physical examination, are any laboratory tests or technique peculiar to the indigenous systems, used by you?	No Vaidyas and Hakims have ever laid any claim to having a method of Physical Examination except the feeling of Pulse, and general observations. The practitioners of the indigenous systems do not resort to any laboratory tests or technique peculiar to the indigenous systems. Their diagnosis, in fact, rests upon symptomatology and imbalance of humours, etc.
5. Are you in favour of any control over the teaching and practice of Indigenous Medicine on the lines of the control by the Indian Medical Council?	Yes. 1. All further admissions into the existing teaching institutions of Indigenous Systems of Medicine should be stopped forthwith with a view to abolish them within the shortest possible time. 2. No new institution teaching Indigenous Systems of Medicine should be allowed to be started. 3. The practising Vaidyas and Hakims should be brought under the control of the State.
6. What measures would you suggest to increase the usefulness of the indigenous systems?	It is futile to try to make the Indigenous Systems of Medicine more useful than what they are. If we seek to reform them in the light of modern knowledge, apparently enough, they will become the corresponding branches of modern medicine. Therefore, the process should be reversed, *i.e.* whatever in these systems stands the tests of scientific scrutiny should be absorbed and synthetised into modern Scientific Medicine. The process, which is rational, will be easy, economical and efficient and will prevent the reduplication of teaching same or similar subjects in parallel institutions.
7. How can the measures suggested be made part of a comprehensive plan of medical relief?	The existing practitioners of Indigenous Systems may be utilized in the scheme of medical relief by taking them up as assistants and technicians and health-workers under scientifically trained personnel at hospitals, dispensaries, laboratories and in Health Services providing for them adequate courses of special training to fit them into the Scientific System of Medicine.
8. How can the existing Vaidyas and Hakims be utilised, as an immediate measure, in any composite scheme of health service in rural areas?	No possible facilities can be offered for improving the training in the Indigenous Systems of Medicine along their existing lines.
9. What measures can be taken to improve the facilities for training in indigenous systems of medicine? Should there be a uniform standard of teaching and examination of these systems all over India?	The present training in Indigenous Systems of Medicine in special institutions should be abolished. As regards medical teaching, there should be only one type of medical institutions, teaching all basic scientific pre-clinical and clinical subjects according to the modern syllabus, under the Medical Council of India.
10. Should the students of the western medicine be taught the indigenous system of medicine? If so, at what stage of their studies?	We do not recognise anything which can be styled "Western Medicine". The students of Scientific Medicine should be taught the action and uses of only those indigenous drugs which after due research and experimentation have been found to be useful and included in the Indian Pharmacopoeia which should be prepared without delay. Such teaching should be done at a stage when the subjects of materia medica, pharmacology and therapeutics are taught.
11. Are you in favour of evolving one system of medicine in India by a process of fusion of the Ayurvedic, Unani and the Western systems? If so, what are your proposals?	Yes. The entire system of the teaching of scientific medicine which is nothing but the indigenous systems developed into a scientific form after labours of four centuries, should be accepted as such and to it should be added what has been found by research and experimentation conducted on the approved scientific lines of to-day and not of by-gone ages to be the best in the indigenous systems. Further facilities should be provided to the graduates of scientific medicine for post graduate studies in the history, theory and practice of indigenous systems and the various universities of medical institutions in the country should add in their research departments a chair for research in indigenous medicine.

CASE NOTES

POSITIVE WASSERMANN REACTION IN CHOREA

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INTRODUCTION

The Wassermann reaction can become positive in a number of diseases apart from syphilis. Laha (1946) reported a Wassermann-positive case of paralytic chorea. Below is reported a case of chorea in whom W.R. became positive. This is the second reported case. The author draws attention to the finding that Wassermann reaction can become positive in chorea though temporarily.

CASE REPORT

B.D., 7 years, Hindu female child, was admitted into the children's ward with the complaints of involuntary movements in the left upper extremity and face, duration about 10 weeks. There was history of rheumatic fever 3 months ago.

Examination—The patient looked healthy. Temperature 98°F., pulse 110, and respiration 20. Cranial nerves intact. There were weakness and loss of associated movement in the left upper extremity. Choreic movements were present in the left upper extremity and the face. Tendon jerks and sensations were normal. Abdominal reflex was present in all quadrants and plantar reflex was flexor. Heart—There was no clinical abnormality except tachycardia.

Investigations—W.R. of blood was very strongly positive (+ + +). Urine and stool showed no abnormality.

Progress and treatment—She was kept under rest with a liberal diet. Aspirin 5 graiens t.d.s. was given. Mother's blood showed completely negative W.R. After about 4 weeks choreic movements gradually disappeared and the W.R. of her blood became completely negative. She was discharged cured.

DISCUSSION

The only point of interest was the very strongly positive Wassermann reaction which became completely negative with the cure of the disease.

It can be concluded that chorea produces temporary haematological changes which are responsible for the positive W.R. As the disease gets cured the haematological changes disappear. The author is not in a position to throw any light on the mechanism of such changes.

Acknowledgment—My thanks are due to Dr. G. N. Vyas, M.D., M.R.C.P., P.M.S., Principal, Medical College, Agra, for his kind permission to publish this report.

REFERENCE

LAHA, P. N.—*Indian M. Gaz.*, **81** : 138, 1946.

TICK TYPHUS

NAVIN CHANDRA, M.B.B.S. (BOM.),

Kanpur

Hindu female aged 60 years, suffering from fever for the last 5 days, the fever coming every evening with some feeling of chill and rising upto 103°F.

Past History—Suffered occasionally from malaria, had come to Kanpur only a month back from Eastern Bengal where fevers of the type she had were common. No history of similar attack in the family.

Examination—Patient had looks of discomfort and exhibited slow cerebration. The tongue was dry and coated. Nothing abnormal was found in the lungs or heart. Abdomen was not distended ; liver just touched the fingers on forced expiration ; spleen not palpable. Reflexes were sluggish, specially the knee jerk. Blood pressure was 130/80 mm. Hg. Pulse 110 p.m. Temperature 102°6F.

Course and Result—Fever continued and was higher the next day and on the 3rd day (that is 7th day of the fever) a rash appeared. The rash was first observed on the hands and feet and later came all over the body. The rash was rose-red, papular and spots were pea-sized and most marked on the face, abdomen and thighs. The rash was abundant in number. Patient at this stage showed some malaise, tongue being more coated and the patient became restless, with insomnia. The condition soon improved and the patient showed all round improvement, the rash became dark spots and fever came to normal on the 16th day, rash completely disappearing on the 18th. On the 16th day the patient showed marked jaundice and there was slight enlargement of the liver, which also resolved slowly and the patient recovered by the 24th day and resumed her normal diet.

Pathological report—

Fifth day—Total W.B.C. 15,150 per c.mm. poly—57 %, lympho—39%, eosinophils—1%, large mono. 3% and there was no malaria parasite.

Seventh day—Aldehyde test—Negative. Widal test—Negative completely.

Weil Felix Reactions: 1/20 1/30 1/100 1/200

OX 19	+	—	—	—
OX K	—	—	—	—

Urine showed only traces of albumin. No M.P. found.

Tenth day—Total 10,000 W.B.C.; poly—75%, lympho—25%.

No M.P. found.

Weil Felix Reactions: 1/20, 1/50, 1/200, 1/400

OX 19	+	+	—	—
OX K	+	+	—	—

Urine—Albumin was not present.

Diagnosis—Tick typhus of the non-epidemic variety.

Treatment—Mepacrine was given 4 tablets per day for 3 days but was soon given up as the drug made no impression on the course of fever. When rash appeared and a diagnosis was made, glucose was given intravenously 50 c.c. every day for 4 days then 25 c.c. for 2 days and later 25 c.c. on the alternate days. Penicillin was started on the first day of the appearance of rash and 200,000 units were given every day dissolved in 3 c.c. of distilled water in a single dose for 5 days. Alkaline Mixture was given every four hours. Barley water *ad lib*, fruit juices and milk were the only diet prescribed.

Discussion

This was a typical case of tick typhus for the following reasons:

1. Early leucocytosis with increased lymphocytes which later turned into increased polymorphs. 2. The typical rash first appearing on the hands and feet. 3. Weil Felix test was only positive upto 1/50 which is again characteristic of tickborne infection as compared with the other variety of typhus where it is positive in higher titre. 4. Enlargement of the liver though at the last stage, is often seen in this disease. 5. The characteristic temperature chart. 6. The case as described is of a mild nature but it may be due to early administration of Penicillin which is capable for turning the tide. 7. The course of fever, pathological reports and predominant symptom of rash rules out any possibility of typhoid, kalazar, malaria.

Comment

Typhus is at present endemic in our province, but with the mixing of population, overcrowding and insanitary conditions may soon develop into an epidemic. Thus it is necessary for medical men to keep the possibilities of the disease in mind.

Penicillin has proved of value in this case. It seemed to be a help in relieving the symptoms of toxaemia and also of shortening the duration of fever.

Acknowledgment

My thanks are due to Dr. R. S. Saxena, M.B.B.S. (Ex. Captain) I.A.M.C. Hony. Pathologist to the Ursla Horsman Hospital, Kanpur, who has conducted all the pathological tests.

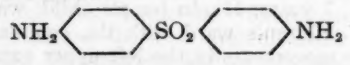
CURRENT TOPICS

COMMENTS ON THE SULPHONE TREATMENT IN LEPROSY

R. G. Cochrane, M.D., F.R.C.P., Director, Christian Medical College, Vellore writes:

In 1945 Faget *et al* (*U. S. Pub. Health Rep.*, **58**: 1729-41, 1943) reported successful results in leprosy by the intravenous injection of Promin. Since that time several articles have appeared in the medical press of a somewhat laudatory nature suggesting that at long last an effective remedy for leprosy has been discovered. The most recent of these articles is that by Muir (*Brit. M. J.*, **1**: 798, 1947). This has resulted in widespread notice of these new preparations in the lay press and numerous enquiries and requests for the supply of these drugs.

The Sulphone group of drugs has been known for a considerable time and it is generally believed that the active principle is a chemical compound known as diamino diphenyl sulphone, the formula of which is as follows:



Following experimental work on animals and *in vitro* with acid-fast bacilli, less toxic substances than the parent substance diamino diphenyl sulphone were manufactured. The first of these derivatives was Promin or di-amino diphenyl sulphone N.N_1 di (dextrose sulphonate). This substance was then followed by a further derivative named diasone, diamino diphenyl sulphone N.N_1 di (formaldehyde sulphoxylate). Two more substances then were synthesised namely Sulphetrone-diamino diphenyl sulphone N.N_1 di (cinnamaldehyde-bisulphite) and Promizole—di (diamino diphenyl sulphone 5, thiazole sulphone). The first and last derivatives are products of Parke Davis, the second of Abbott & Co., and the third a product of Burroughs & Wellcome, London.

It should be remembered that up-to-date only Promin is on the market; the other sulphone derivatives are still undergoing clinical trial.

It cannot be emphasised too strongly that premature conclusions indicating that these drugs are established remedies for leprosy would be disastrous and remedies which hold definite promise might fall into disrepute in a few years, and join the limbo of forgotten things. This has so often happened with remedies in the past which have been boosted as 'cures' for leprosy that I recently issued a warning note in the *Brit. M. J.*, **2**: 110, 1947. This article is a further attempt to review this subject dispassionately so that the many who are longing for a more effective remedy for leprosy may not prematurely conclude that Promin or any of these drugs can now be safely used.

I believe that there is evidence that diamino diphenyl sulphone and its derivatives have a bacteriostatic action on the *M. leprae*, but I am certainly of the opinion that the time has not come for the

wide-spread use of any of these drugs. It should be remembered that what we are looking for is an effective, easily administered, non-toxic drug for lepromatous leprosy. Neural leprosy, particularly tuberculoid leprosy does not lend itself to specific treatment. The attention of the physician in neural leprosy should be focussed on the prevention and alleviation of deformities, and measures for restoring pigment in the hypopigmented patches. By concentrating on a socalled 'cure' detracts attention from these important remedial measures, and while these 'specific' remedies are being given, paralysis, paresis, trophic ulceration and other serious sequelae, due to nerve damage progress and the physician tends to lull himself into a false sense of security thinking that so long as treatment is being given these conditions will right themselves! Tuberculoid leprosy and the large atypical groups are well known for their tendency either temporarily or permanently to heal spontaneously; therefore any dramatic results in these groups should not necessarily be attributed to the drug but to the natural evolution of the disease.

Further it is to be remembered that in this long drawn out conflict mankind has with the microbic invaders of the body that the enemy can also retaliate. If these derivatives are given in the wrong type of case or not administered properly a sulphone resistant strain of *M. leprae* might be produced. If such an eventuality took place it might mean that the bacillus would either multiply very rapidly, or if the patient turned into lepromatous leprosy it would be found just when these drugs should be administered that they had lost their effectiveness. Therefore, the practising physician who is treating leprosy as one of many diseases is earnestly warned not to use these drugs until much more work has been done, but to continue with the hydnocarpus remedies until the sulphones have been proved to be effective and a more practical method of administration devised. It should be pointed out, while hydnocarpus remedies are disappointing, yet if properly applied do give results in a large number of cases and should not be altogether discarded.

Again it must be remembered that most of these substances have to be given by mouth. Further, by mouth the diamino diphenyl sulphone derivatives have a retarding action on the intestinal flora and this interferes with the synthesis of vitamin B complex in the gut resulting in disturbances of the blood and other deficiency manifestations. Therefore, large doses of yeast and iron must be administered along with these substances.

The various remedies will now be discussed indicating the drawbacks in each case.

Promin

Faget (*Internat. J. Leprosy*, 15: 1-13, 1947) states the following in regard to dosage:

This drug is given intravenously one 5 gms. ampoule per day for six days resting on the 7th day. Because of the marked tendency to anaemia full doses of iron and yeast must be administered. It is true that if patients are willing and can tolerate the drug and if it is given over a period of 2-4 years there is marked improvement. Faget claims that after four years of continuous intensive treatment the incidence of negative reports exceeds 50 pr cent, for seven out of the eight cases treated for this period of time had become negative. Out of 163 cases 19 became negative in the four years, but these patients were on treatment for varying lengths of time from less than one year to more than four years. While it is admitted that these results are significant for the type of cases treated had not improved with hydnocarpus therapy, yet the total percentage was no more than can be achieved in a well run Indian institution. However, such a statement may need drastic modifying after the whole 163 cases have been on these drugs for a longer period. As the market price of promin is Rs. 5 per 5 gm. ampoule and as we have found that the majority of cases in Indians, which we have treated have shown poor tolerance to the drug, this remedy is not recommended.

It is to be borne in mind that the price of promin for institutions is prohibitive and that few patients, even though they can afford the drug, under outpatient conditions would be willing, or would attend regularly enough, or be prepared to persist for the length of time it is necessary to achieve results. Physicians are warned that clinical results in leprosy do not necessarily correspond with bacteriological results for clinical improvement, some times marked improvement, precedes bacteriological improvement. Further, insufficient dosage or intermittent treatment may be dangerous, in that as yet we know nothing of the possibility of producing a sulphone resistant strain of the bacillus.

Diasone

While this drug is not on the market* it apparently is available for widespread clinical trial. Our trials of this drug have shown that the administration of diasone in a significant number of cases precipitates lepra reaction. Fernandez (*Internat J. Leprosy*, **14**: 19-29, 1946) mentions this, but thinks that it is not of great importance. When discussing these remedies with biochemists in England it was pointed out to me that in small doses the sulphone derivatives may be capable of stimulating multiplication of acid-fast bacilli. If this is the case, this may explain why in the early stages the administration of diasone may result in 'lepra reaction'. Curiously enough children tolerate diasone better than adults, and most children even young children can take adult dosages (three capsules per day). It is suggested that because of this the concentration of diasone in the body is built up much quicker in the child, and therefore reaches a level which results in a bacteriostatic action of the drug on the bacillus. If those in leprosy institutions have been given supplies of diasone for trial we consider that it would be well for them to discard the advice to

* This drug is now on the market at Rs. 250 per thousand tablets.

increase the dasage slowly. For the above reason I believe that maximum dosage 3 to 4 capsules of diasone per day should be reached as rapidly as possible. 1 capsule a day for four days, 2 capsules a day for four days and then 3 capsules a day for two weeks, then four capsules or even five capsules a day or more may be given. Our experience is that patients seldom can tolerate more than 4 capsules per day. If a patient can be persuaded to persist with the drug in spite of reaction, he can be assured that in the course of time, 3 to 6 months the reactions will probably slowly stop and the beneficial results of the drug will be seen. Blood examination must be taken at regular intervals, and no institution which is not equipped with accurate means of estimating the total white and red cells and doing the Hb. index by standard colorimetric methods should attempt to use these drugs. Further, during the whole course of treatment full doses of yeast, 12 tablets of a reliable yeast (D.C.L. or Squbb's) per day must be taken, and full doses of iron equivalent to 90 grs. of ferri et ammon citrate should be administered. For the reasons stated, I believe the sulphone preparations should be continued without respite until the patient has become negative. Other workers advise periods of rest but we believe intensive and prolonged courses of treatment will be found to be of greatest benefit.

Sulphetrone

This is only available for experimental trial to selected institutions. Sulphetrone up-to-date, in my opinion is the least toxic derivative of the sulphones if administered with due precautions. Further, it is least likely to set up 'lepra reactions'. The drawbacks of sulphetrone therapy are two fold:

(1) The dosage is large, 12 tablets a day combined with 12 tablets of yeast.

(2) It is essential to make periodic estimation of the sulphone level in the blood for occasionally a case shows an abnormally high blood level.

(3) Constipation must be avoided at all costs. Unless the physician can be certain that the patient is reliable in this matter disaster may follow, for if constipation persists a column of sulphone is built up in the gut which cannot be removed and even though the drug is stopped the patient continues to absorb sulphones from the gut. A sulphetrone death, while extremely rare, is so dramatic and tragic, (I am told) that not the slightest risk should be taken.

While in our trials with sulphetrone and the other sulphone derivatives we have had some very encouraging clinical results, and with sulphetrone marked bacteriological improvement, we have not yet in a period of over a year brought any patient to a state of being completely bacteriological negative to standard methods of examination. Our experiments have however not continued for a long enough period.

It would not be out of place to mention streptomycin in the discussion of these newer remedies for acid-fast organisms. A very grave warning is necessary in respect to streptomycin and no one should contemplate its trial until it has had a much more extensive experimentation at the hands of experts. I have been unable to follow the literature on the subject, but I am told that in tuberculosis while there have been a few dramatic results in tuberculous-cerebro-spinal meningitis and in miliary tuberculosis, that of all these drugs the administration of streptomycin is the most liable to result in the development of a resistant strain of the acid-fast bacilli. Further, the following extract describing the experiences of a patient receiving streptomycin will, I am sure, effectively warn the unwary from contemplating trials of this drug at this stage: 'Streptomycin was continued for eight months and the vertigo from which I started to suffer from my third week of streptomycin still persists to the extent that I have to use a wheel chair, and when I am in the dark I am apt to kiel right over like a top-heavy battleship'.

Until the possibility of permanent and irreversible vestibular damage has been overcome streptomycin should not be used except under conditions of expert supervision and such conditions are unlikely to be available in this country for a considerable time.

The therapeutics of leprosy has entered a new and most interesting phase. Many feel that we are on the edge, at last of discovery of an effective remedy for lepromatous leprosy. The road is hard, the condition of travelling arduous; let us not by trying to take short cuts end by falling over the precipice called 'false hope', but wait patiently until these remedies are established and not be tempted prematurely to administer products which are as yet inadequately tried, impossible of widespread application and possibly dangerous. Once it can be definitely said that a given remedy is safe and easy of administration and effective, means will be taken to see that widespread publicity is given to these drugs. Meanwhile, to those who would wish to rush in and prematurely use these powerful remedies, it is earnestly urged that they should restrain their enthusiasm and learn to administer the hydnocarpus remedies properly not turning to other drugs until much more is known about them. 'Leprosy has its roots in the dim ages and has a disconcerting habit of confounding those who would be over-optimistic. The past twenty-five years are strewn with the results of alleged cures. It therefore would be wise for us to remember this and not publicize too widely a new hope. It we do, administrative authorities may once again find themselves thwarted when they had high expectations that the problem had become easy of solution. Further, we tend to forget the psychological effect on the patients, for those who have severe lepromatous leprosy clutch at a new remedy as a drowning man would grasp at a straw' (Cochrane—*loc. cit.*)—*J. Christian M.A. of India, Burma and Ceylon*, **22**: 211, 1947.

NOTES AND NEWS

I.M.A. RESEARCH FOLLOWSHIP

Dr. P. K. Guha, M.B., M.R.C.S., D.O.M.S., Hony. General Secretary, Indian Medical Association invites applications for four Research Fellowships under the Indian Medical Association Research Fund of the value of Rs. 250 each per month. The fellowship is open to men and women and will be tenable for a period of not more than two years. The applicants must be medical practitioners whose names occur on the Provincial Medical Registers.

The applicants must furnish the following informations in their applications along with certificates of physical fitness and character.

(a) Full name; (b) Age and Sex; (c) Permanent address; (d) Details of academic career, including particulars of previous research work done by the candidate ; (e) Particulars of the proposed research scheme; (f) Details of financial supports from other sources which the applicant will be in receipt of during the period of fellowship.

The note on the proposed research under item (e) should give (1) a resume of research work done on the subject, indicating the proposed state of the knowledge on the subject (ii) details of the proposed research, indicating (i) the methods to be employed, (ii) previous experience in the use of these methods and (iii) the experiments to be carried out.

Five typed copies of the note on the proposed research should be sent.

Applications must be forwarded through the Principal or the Dean of a Medical College or the Director or the Officer-in-Charge of a Laboratory or Institute where the applicant proposes to work and be accompanied by a letter from the forwarding authority that he has critically examined the details of the proposed research and that he is willing to guide and direct as far as possible the investigation and provide laboratory facilities and the contingent expenses for the particular line of work will be provided by the College or the Institute concerned.

The progress of the work must be communicated every six months to the Hony. General Secretary of the Indian Medical Association, 23, Samavaya Mansion, Calcutta—13.

Typed applications should be addressed to the Hony. General Secretary, Indian Medical Association, 23, Samavaya Mansion, Calcutta—13 so as to reach the Association Office before the 30th April 1948.

NOBEL PRIZE FOR CHEMISTRY

The award of a Nobel prize to Sir Robert Robinson, P.R.S., comes as no surprise. It is probably fair to say that he has made more positive contributions to synthetic organic chemistry than any man, living or dead. Where other eminent organic chemists have been content to till one or two fields, he has raised crops from many. His work on the alkaloids, for example, is outstanding, and this perhaps is his favourite line ; but he is known equally for his achievements with anthocyanine pigments, antimalarial compounds, penicillin, sterols, and sex hormones ; while his Faraday lecture at the recent centenary celebrations of the Chemical Society showed that he is equally at home in purely theoretical chemistry. Many good wishes will go to Sir Robert and Lady Robinson, herself a distinguished chemist, on this present recognition of his genius.—*Lancet*, **2** : 767, 1947.

NATIONAL GASTROENTEROLOGICAL ASSOCIATION 1948 AWARD CONTEST

The National Gastroenterological Association again takes pleasure in announcing its Annual Cash Prize Award Contest for 1948. One hundred dollars and a Certificate of Merit will be given for the best unpublished contribution on Gastroenterology or allied subjects. Certificates will also be awarded to those physicians whose contributions are deemed worthy.

Contestants residing in the United States must be members of the American Medical Association. Those residing in foreign countries must be members of a similar organization in their own country. The winning contribution will be selected by a board of impartial judges and the award is to be made at the Annual Convention Banquet of the National Gastroenterological Association in June of 1948.

Certificates awarded to other physicians will be mailed to them. The decision of the judges will be final. The Association reserves the exclusive right of publishing the winning contribution, and those receiving certificates of merit, in its Official Publication, *Review of Gastroenterology*.

All entries for the 1948 prize should be limited to 5,000 words, be typewritten in English prepared in manuscript form, submitted in five copies, accompanied by an entry letter, and must be received not later than April 1, 1948. Entries should be addressed to the National Gastroenterological Association, 1819 Broadway, New York 23, N.Y.

III INTERAMERICAN CARDIOLOGICAL CONGRESS

The Interamerican Society of Cardiology has authorized the meeting of the III Interamerican Cardiological Congress, to be held in Chicago, Illinois, at the Michael Reese Hospital, from June 13 to June 17, 1948. This meeting will take place immediately before the American Heart Association annual meeting, June 18th and 19th, and the American Medical Association meeting the week of June 20th. Inquiries regarding the Congress may be addressed to the offices of the III Interamerican Cardiological Congress, at the Michael Reese Hospital, Chicago, Illinois, U.S.A.

NAPT COLONIAL SCHOLARSHIPS

The following are the successful candidates for training in Great Britain in 1948 :

Dr. Motala, M.B., B.S. (Bombay). In charge of

Kibongoto Tuberculosis Hospital, Moshi, Tanganyika.

Dr. Victor Edson Donawa, M.D., C.M. (McGILL). Grade A. Medical Officer (Tuberculosis), Medical Department, Trinidad.

Dr. Mamoun Hussein Sherif (Graduate Kitchener School of Medicine). Medical Inspector in Sudan Government.

Mr. Daniel Kofi Twimasie, A.R.S.I. (LONDON).

Nuse Veronica Au, M.B. Class A Certificate. Staff Nurse,, Middleton Hospital for Tuberculosis Diseases, Singapore.

Mr. Joseph C. Agius. Sanitary Inspector, Malta.

OPPORTUNITY IN INDIA

163 years of British rule in India came to an end with the formation of Pakistan and India as self-governing Dominions. On Aug. 14 some of the medical aspects of this change were discussed at a gathering in London called by Lord Moran, R.C.P., to hear Dr. R. G. Cochrane, F.R.C.P., Principal of the Mission Medical College at Vellore in the Madras Presidency.

When it was known that India was really to have independence, Dr. Cochrane said, the tension snapped and the attitude towards Britain changed overnight. But fewer and fewer British doctors will be going to India, and the governments are likely to want official services to be manned by Indians. In this situation scientific standards are threatened by the backward pull of Eastern medicine, while professional integrity must be weakened by any weakening of the Christian ethic. If the mission hospitals disappear the Christian ethic will disappear too, and if that happens Western medicine will inevitably go into eclipse. It is essential moreover, for India to have independent voluntary hospitals able to set a standard for the government institutions. In Madras a health minister whose wife was an Ayurvedic practitioner recently tried to establish five colleges of Ayurvedic medicine and induce the University of Madras to recognise this subject; and though the proposal was defeated it could be revived by a turn of the political wheel. It was felt that the only way to counter such retrograde influences was to create a medical college with an international reputation and train men and women who would follow its standards. To meet the challenge Vellore was converted from a lower-grade school, preparing students for the L.M.S. diploma, into a university college providing the educational background for positions of responsibility. The difficulties of finding a good enough staff are being overcome, and if money is forthcoming for the next few critical years Vellore may be able to do more to influence research and education than any other institution in the East. Though he himself is especially interested in leprosy, Dr. Cochrane felt that nowhere is this lead needed more than in psychiatry, where India is at the stage of England 200 years ago. Today there is a great opportunity, and Vellore College, a joint effort of the Churches of half a dozen countries, could do much to cement the friendly relationship with Indians which we all so much desire.

In response to questions Dr. Cochrane said that a proportion of Indians have undoubted aptitude for scientific work, but in the official institutions research is apt to be crippled by lack of staff and consequent lack of time. Moreover many Indians are strangely attracted to Ayurvedic medicine, just as laymen in England are attracted to bone-setters. Dr. Cochrane agreed with Mr. Ian Orr and Sir Philip Manson-Bahr that the study of Ayurvedic remedies should go on, but he described Ayurvedic medicine in general as that of the Middle Ages and worse. Sir Francis Fraser spoke of the training of future Indian teachers in Britain, where a first batch of 50 have already been placed and pleaded for continuation of efficient selection of these students at the Indian end. Sir Weldon Dalrymple-Champneys echoed Dr. Cochrane's regret that the Bhore Committee's recommendations are likely to fall into the background. The Christian ethic, he said, is the only moral backing for medical practice in India, which without it must revert to the past. It is something not imposed on Indians against their will, but a source of strength and inspiration on which many Indians depend in their struggle against political and other forces opposed to science.

As Lord Mountbatten said to the departing troops, British rule in India has ended but its place is being taken by something far more valuable—friendship between the British and Indians. To this friendship, which is needed on both sides, medicine could contribute much.—*Lancet.*, **2**: 286, 1947.

MINISTRY OF HEALTH STATEMENT ON STREPTOMYCIN

The Ministry of Health Great Britain announces that the preliminary results of the streptomycin trials organised by the Medical Research Council have proved sufficiently encouraging to justify the view that, as supplies of the drug permit, patients suffering from tuberculous meningitis or miliary tuberculosis should be given the opportunity of receiving treatment with the drug.

Streptomycin is the best drug at present available for the treatment of these conditions, but it prolongs life and relieves symptoms in only a proportion of cases, and it is too early to say whether it ever produces a permanent cure.

The production of streptomycin in this country is still very limited; but additional supplies obtained from the United States have made it possible to allocate some each month to certain medical schools for use in teaching or associated hospitals. Supplies are available at the moment in the United Kingdom for about 150 beds. The cost of the streptomycin is still very high, and for the time being the drug will be distributed by the Government to the medical schools free of charge.

In view of the limited experience of treatment with streptomycin in other conditions, the medical schools have been asked for the present to restrict treatment with drug to cases of tuberculous meningitis and miliary tuberculosis. It is not recommended for chronic pulmonary tuberculosis.—*Lancet*, **2**: 6, 1947.

URBAN REHABILITATION AND MEMBERS I.M.A. JULLUNDER CITY

In view of apprehension that is being caused among the members of independent medical profession by the latest instructions issued by the Government regarding cancellation of all previous allotments and starting of re-allotment of accommodation, the I.M.A. (Indian Medical Association) Executive Committee, Jullundur feels greatly concerned and has in its meeting held on 31st December, 1947 passed the following resolution:

Resolved to send the following letter to Director General, Urban Rehabilitation, Jullundur:

Allow us to draw your attention to the coming re-allotment of houses by Committee of Citizens and the need of careful disturbance of houses to members of the medical profession according to their needs. This is more in the interest of the public than of the profession. Amongst the problems facing the rehabilitation of refugees, the maintenance of their health and the treatment of their sick is of prime importanoe. The Indian Medical Association, as you are aware has been giving yeoman service through all of its members in attending and treating the sick in all the refugee camps in Jullundur, ever since the start of disturbances without any remunerations. The Government authorities at Delhi have realised that medical men in general and specialists in particular are one of the greatest assets of a free nation and have accordingly given them first priority, after the allotment of houses for the ministers in setting apart one hundred houses for them. There is no reason why a similar procedure should not be followed at Jullundur, especially when the Hon'ble Premier of East Punjab has sent individual invitation to various medical men of repute to come and settle in East Punjab.

In view of the above facts we request that special regard be given to the following points during the re-allotment and instructions sent to the allotting authorities.

(*i*) A definite number of houses be set apart for medical men and their allotment should receive the first attention of the Committee.

(*ii*) No doctor should be dislodged from the house which he is already occupying and wishes to retain.

(*iii*) The medical clinics of the doctor and particularly of consultants,, including their consulting rooms, visitors room, operation room laboratory and room for indoor patient if he treats any and their dispensaries should not be counted in the "Living Space", for purpose of rationing of such space.
The motor conveyance of a medical man should not be requisitioned.

(*v*) Since a doctor is a very important citizen of a town, the Allotment Committee should include at least one doctor (a representative of Indian Medical Profession) as has been done at Delhi.

CORRESPONDENCE

The Editor is not responsible for any views expressed by contributors

INDIGENOUS SYSTEMS OF MEDICINE

Sir,—I request the hospitality of the columns of your very valuable journal for the following—

I happened to go through the Special Article on the Indigenous Systems of Medicine, published in your Journal of September 1947, and in my opinion it reflects no credit on the authors. It smacks more of propagandist's zeal, than of any sustained spirit of Scientific Enquiry.

I would indeed like to be convinced with any material data that the 'Thridosha Theory' was given up by the Western Scientists after any tests and trials. To me, the truth of the matter appears that Indian Medicine like Indian Philosophy and Indian Art, is not to be viewed with Western Standards. I certainly would like to echo the sentiments that 'Truth of Science cannot be a respector of Nations'. But the approaches to this ultimate truth differ. There is a peculiarly Indian approach to all problems of life, that at once baffles the uninitiated, and enlightens him that makes a proper approach.

It is relevant to bear in mind that all the treatises in Ayurveda are in Sanscrit, and as such a knowledge of Sanscrit is a *sine qua non* for any understanding of Ayurveda. There is no other royal road. If the Government and others who speak of Scientific advancement are only serious about their business, a committee consisting of scholars in Sanscrit should set about interviewing persons who could speak with authority on Ayurveda. Persons with a bias for Western Medicine, and lacking in Sanscrit knowledge are more apt to approach the study of Ayurveda, with pre-conceived notions and are not fit to undertake this task.

Has Ayurveda no National basis even as conceived by these devotees of Western Science? I am a student of Western Medicine myself, and I am convinced that these self-styled Apostles of Western Science, will not sit in vain at the feet of Masters of Ayurveda if only they will shed their pretence of omniscience and superiority complex. Let any one who has rushed to criticise, as he has done in the memorandum, take the trouble to go with me to Malabar. There are men well-versed in Ayurveda there, who even in these days are not swayed by the love of lucre, and whose sole aim is to serve humanity. They are not in the habit of appropriating the spotlight of propaganda on them, or throw out cheap sneers and false gibes, on others without the competence to understand them.

It is unfortunate that these 'Surat Medical Men' have rushed to condemn Ayurveda by looking at the malpractices of some of the quacks that infest the country. Quacks and charlatans exist in every walk of life and will disappear only when ignorance and darkness are banished from this earth. But is it fair to condemn a System of Medicine, which, what-

ever its merits or demerits, has stood the test of ages, merely because of the crude practices of some charlatans.

Let me not be misunderstood. I have no sympathy with the hybridisation experiments of our Provincial Ministries in trying to combine Ayurveda and Allopathy. This results only in a curious amalgam, which does no one any good. The fact is, each system of medicine, be it Allopathy, Ayurveda, or Unani, is to be mastered by a long course of discipline and patient study. Hybridisation leads only to a half-baked knowledge which injure the cause it seeks to promote.

Let not Science be stifled in the name of Science. I invite these medical men, by professional conferers to suspend their judgment till at least some of them go to Malabar with a spirit to learn. My humble services are at their disposal. I assure them they will awaken to a whole vista of unrecognised knowledge. If they are proficient in Sanskrit, all their doubts regarding the scientific basis of Ayurveda can be cleared.

Will they try to learn or is their outburst meant not to save Science, but something else? I am etc.

R. KRISHNA IYER, L.M.P.

Palladam, 9-12-47.

LICENTIATE DOCTORS IN COAL-FIELDS

Sir,—I shall be much obliged if you would kindly publish the following through your much esteemed paper.

The Asansol Mines Board of Health and the Chief Sanitary Officer, Asansol, have taken up a sinister drive to eliminate the Licentiate doctors of the colliery service from the coalfield and as such have submitted a suggestion to that effect to the Labour Welfare Board, Dhanbad which is directly responsible for the welfare and progress of the labour in coalfield.

We fail to understand, why a responsible body like Asansol Mines Board of Health and the sensible personality like the Chief Sanitary Officer could jump into enthusiasm to declare a War against the Licentiate doctors of the coalfield when their own house, I mean the Board itself is packed with bulk of licentiates and we also fail to understand why the said body and personality could so easily arrive at a clear cut destructive policy which might involve an All-India issue, when the Central and Provincial National Governments, have still been puzzled to tackle this problem and also when the West Bengal Government have directed the Medical Schools to work double shift to produce more doctors to meet the country's demand.

Naturally, we are inclined to believe on facts and reasons that such a move has not received or will not receive the approval of the Provincial and Central Governments. Hence, it stands to reason and logic if the Asansol Mines Board have failed to secure the approval of the Central and Provincial Governments, may we ask on whose authority they have made such an attempt which is likely to affect an all-India issue. On the other hand, if the Central or Provincial Government have extended their approval to this, may we ask the National Central and Provincial Governments the correct Government policy with special reference to West Bengal Government's directive to working of double shifts of the Medical Schools?

The part of the country affected in general and the Licentiates of colliery services in particular, will be grateful to receive a proper reply through your paper, from the quarters concerned. I am etc.

Dhemo Main Colliery, B. MAZUMDER
Barakar P.O. (Burdwan),
24-12-47.

CURRENT MEDICAL LITERATURE

CLINICAL CYANOSIS

The clinical assessment of the degree of cyanosis is notoriously difficult, even to the observer with an artistic eye, and the clinical detection of slight cyanosis is no easier. According to Lundsgaard and Van Slyke (*Medicine*, Baltimore, *2* : 1, 1923), cyanosis will not be detectable until 5 g. of reduced haemoglobin is present in 100 ml, of capillary blood, which corresponds to an arterial oxygen saturation of 80%. Stadie (*J. Exper. Med.*, **30** : 215, 1919), however, found that the correlation between arterial oxygen saturation and clinical assessments of cyanosis varied considerably. For instance, in 12 patients with 'moderate cyanosis' the saturation ranged from 65% to 91%, while in 12 patients with 'marked cyanosis' the saturation ranged from 56% to 86%. Comroe and Botelho (*Am. J. M. Sc.*, **214** : 1, 1947) have now measured the highest arterial oxygen saturation at which 127 observers (105 medical students and 22 physicians) could detect cyanosis in 20 healthy young men. Each experiment lasted for half an hour, during which time the subject was given different concentrations of oxygen to breathe (100%, 12%, 10%, 8%, and room air). The observers were unaware when the alterations were made, and they were asked to note every half-minute whether the subject's colour was 'normal' 'slightly or questionably cyanotic', or 'definitely cyanotic'. The results are interesting in more ways than one. When the arterial oxygen saturation was 96-100%, a quarter of the diagnoses were 'slight cyanosis'; and a quarter of the students and an eighth of the physicians also noted slight cyanosis when the arterial oxygen saturation was reduced to 71-75%. At a saturation of 81-84% about half the observers diagnosed 'definite cyanosis'. Individual observers varied fairly widely in the saturations at which they noted definite cyanosis in consecutive trials on the same subject, and there were differences of opinion in simultaneous assessments by different observers of one subject. For instance, in one subject 'definite cyanosis' was diagnosed by one physician when the arterial oxygen saturation was 94%, whereas another physician did not make this diagnosis until the saturation had fallen to 71%. The observers who participated in many experiments were no more consistent than those who took part in only two, and 'the physicians as a group were no more consistent or able observers than were the inexperienced students.'

Arterial anoxaemia is the indication for the administration of oxygen, and it is clear that wherever possible

this invaluable and often life-saving procedure should be carefully controlled by estimation of the arterial oxygen level, bearing in mind that high concentrations can be dangerous. This does not, however, mean that oxyygen should be withheld simply because there is no laboratory handy. The sound rule is: when in doubt give oxygen—*Lancet*, **2**: 432, 1947.

The Emotions in Gastro-intestinal Disturbances

Cathcart (*Canad. M. A. J.*, **55**: 465, 1946) writes: "No other function of the body plays a greater part in the emotional life of a person from infancy than does the taking of food. To the healthy and happy infant, feeding and loving are inseparable." Alexander divides his gastrointestinal cases of emotional origin into three groups: first, the largest group, patients with a range of symptoms from minor disturbances, such as epigastric distress, nausea, belching, heartburn, etc., to actual peptic ulcer. The second group has diarrhea as the predominant symptom, and the third, chronic constipation.

Alexander tries to understand the patient's emotional attitude to his environment in terms of three tendencies:

1. to receive or to take,
2. to retain,
3. to give.

If the normal channels of emotional expression are blocked by inner conflicts, the gastrointestinal tract may be used instead, in the first group, in the conflict between deep-seated urges for dependency and the attempt to deny or reject them. Some identify this dependency urge as maternal attachment, which is denied by the patient or frustrated by the circumstances. The maternal dependency theory may provide some explanation for the prevalence of gastrointestinal disturbances in males.

In the second group the same conflict is present, but it is expressed through painful evacuation, expressing an effort to make restitution and also aggressive, and even sadistic, tendencies.

The third group represents a rejection of an obligation to give and is often associated with tendencies of thrift and even stinginess.

The author has given special study to the first group and has only a limited experience with the other two. He is in agreement with Alexander's views to a large extent in relation to the first group on the basis of his own studies, and is therefore included to give them prominence, also, for the other groups.

Peptic ulcer and conditions commonly referred to as "gastric neurosis" or "functional dyspepsia" are put in the same group by the author (stemming from similar psychic mechanisms). Going even further, a close kinship is claimed between peptic ulcer and the psychoneurosis-anxiety type. This was seen statisticaly in hospital admissions in the Canadian Army, where an amazing parallelism was found in the hospitalization incidence of peptic ulcer and anxiety neurosis. These observations may throw more light on the parallelism:

1. Frequently both entities are present in the same patient.

2. A family pattern of anxiety and tension may express itself in different members, sometimes as anxiety neurosis, and sometimes as peptic ulcer or some other variant. Every case study should therefore include inquiry into all those possibilities and their occurrence in the family history.

3. The author's psychological studies showed a certain interchangeability in the life histories of his peptic ulcer and anxiety neurosis patients. He believes that no case of peptic ulcer is being adequately treated ". . . . without a study of the unhealthy emotional background."

4. Rubin and Bowman, in recent studies, found some indication for electroencephalographic and personality correlations between anxiety neurosis and peptic ulcer.

In ulcer cases there is a pronounced liability of the autonomic reflex in response to minor psychic stress. It is believed, therefore, that imposed cautions and restrictions tend to create their own somatic tensions, which might even outweigh the expected gains. The author and his associates often successfully removed restrictions, and put the patients on a full diet without medication, after first clearing up the conflict material. In the treatment of his cases, besides individual psychotherapyy, apparently kept as superficial as possible, group therapy and re-education also were used. It was found that psychotherapeutic methods of dealing with anxiety neurosis are equally effective in peptic ulcer.—*Psychosomatic Medicine*, *9*: 2, 1947.

Functional Gastrointestinal Disorders: Lessons learned from Military Medicine

Halstead (*New Eng. J. Med.*, **235**: 747, 1946, Ref. *Am. J. Digest. Dis.*, **14**: 274, 1947) writes that functional gastrointestinal disorders, which constituted a large part of the disability from medical causes in the United States Army during the war, were found to be best treated, not by sedatives, diets, antispasmodies, rest, or hospitalization, but by dealing with personality disturbances directly and promptly. In patients with symptoms superficially resembling ulcer, 80 out of 100 studied were found to have psychoneurotic symptoms which rendered them unfit for military duty. Among the actual ulcer patients, only 6 per cent were rendered ineffective by psychoneurosis. The ulcer patient presented a restless, ambitious personality, with excessive self-reliance, and no tendency to make use of his symptoms to avoid duty. The patient with functional dyspepsia was submissive, passive and tended to use his symptoms in order to avoid unpleasant situations. Clinical symptoms of these two groups of patients are described. The above study was made on an overseas combat group, and results are contrasted both clinically and psychologically with patients seen in civilian practice. Four main explanations for functional gastrointestinal disorders are outlined: (1) primarily associated with organic disease, (2) excessive physiological strain, (3) low threshold for gastrointestinal symptoms, (4) emotional disturbance or neurosis. It is recommended that treatment be based upon whichever of the above causes is pertinent. Bed-rest, diet, and drugs, in the treatment of neurosis, unless used merely as temporary adjuncts to psychotherapy, are considered detrimental because of secondary gain. Delving deeply into the background of the patient was found unwise, in the military

setting, but simple psychotherapy on the realistic level of being told what the trouble was, and that the patient would have to get used to it, was found effective. The diagnosis itself, of the functional disorder, was found very helpful to the patient's adjustment. Psychotherapy was found most difficult in the group with psychogenic symptoms, which constituted four-fifths of the soldier patients and is estimated to be a large group in civilian practice also, as this type of patient resists seeing that his symptoms are based on emotional conflict, avoids psychiatric treatment but prefers physical treatment, and may have firmly fixed dependence upon medical rituals.

A Simple Test for Viability of Strangulated Bowel

Lichtenstein (*J. A. M. A.*, **135**: 221, 1947) draws attention to the value of the inhalation of 100 per cent oxygen in determining the viability of strangulated bowel. Should blood be circulating through the wall of the affected part of the bowel, this is shown by an immediate change from a dusky colour to a bright pink colour following the inhalation of 100 per cent oxygen. It is also stated that inhalation of oxygen assists in recovery of the affected segment, as it diminishes or abolishes vascular spasm; this effect can often be noted as the vascular pulsation becomes fuller and more vigorous. Therefore, if following the inhalation of oxygen there is neither change of colour nor appearance of vascular pulsation, then the probability is that the affected segment is nonviable. Stress is laid upon the fact that like all other similar tests, this one must only be interpreted in conjunction with all the other available clinical data.

Treatment of Major Burns in 1940 and 1946

Mukherjee (*Indian M. Gaz.*, **82**: 462, 1947) writes that in 1940, 80 burn cases were treated in the Campbell Hospital, Calcutta, with saline for shock and tannic acid for local areas with a mortality rate of 13·5 per cent from shock and 12·5 per cent from infection.

In 1946, 91 burn cases were treated with serum for shock and compression dressing with sulphathiazole and vaseline gauze for local area with a mortality rate of 9·5 per cent from shock and 4·5 per cent from infection.

Excluding cases with more than 50 per cent area burnt, the mortality rate (8·4 per cent) and the incidence of severe infection (14·7 per cent) in 1946 have been brought down to nearly one-third of those in 1940 (mortality rate 21·3 per cent, incidence of infection 36·3 per cent).

In 1946, average stay of a patient in hospital (13·7 days) is decreased to almost half of that in 1940 (24·2 days).

Penicillin is the best drug for combating infection in burn cases, only one case died of infection when penicillin was being given as routine measure in cases with more than 10 per cent area burnt.

The simple procedure of compression dressing described in the article is recommended for all cases of burns.

Advances in Vascular Surgery

Speaking to the International Society in London on 16-9-47, Prof. Rene Leriche (Paris) declared that most of the notable advances in the technique of surgery of the blood-vessels are derived from Alexis Carrel's work forty years ago on suture, anastomosis, and grafting. The study of vasoconstrictive reactions has led to such procedures as intra-arterial injection of 'novocain' or of 'eupaverin,' arterial resection, circumarterial sympathectomy, ganglionectomy, adrenalectomy, and blocking of the sympathetic nerves to eliminate vasospasm. The study of thrombosis also derived from Carrel, has led to the use of heparin to prevent intravascular clotting. Finally arteriography has revealed to the surgeon the lesion with which he has to deal.

The introduction of these procedures has greatly facilitated surgery of the blood-vessels. Thus, in resection of a main artery damaged by trauma, syympathectomy or sympathetic block prevents vasoconstriction of the collateral vessels and allows the blood to return to the distal part of the resected artery, so that arterial continuity can be restored by lateral or circular suture or grafting, in which case penicillin and heparin are indicated. Sympathectomy, or sympathetic block, is also useful in dealing with aneurysms and arteriovenous fistulae. With aneurysms, the collateral circulation can be promoted by compression of the aorta or of the femoral artery. In arteriovenous fistulae, sympathectomy or sympathetic block is usually sufficient to prevent gangrene, but embolectomy should always be attempted with the use of heparin, which may even allow recanalisation. In late cases arteriectomy should be performed.

In obliterative thrombo-arteritis cures have been effected, lasting up to 19 years, by bilateral ganglionectomy and unilateral adrenalectomy. If large vessels are implicated, resection and ganglionectomy may produce good and lasting results. Ganglionectomy and arterial resection, either separately or together, have also produced good results in senile arteritis, avoiding the need for amputation.

For congenital malformations, such as pulmonary stenosis, patent ductus arteriosus, and coarctation of the aorta, Gross, Blalock, Alexander, and Crafoord have opened a new chapter in arterial surgery, for which Professor Leriche said he could but express his admiration.

In surgery of the veins, heparinistion and lumbar sympathetic block have revolutionised the treatment of phlebitis of the leg. Where there is early massive thrombosis, the thrombus should be removed by operation and the vein either sutured or resected; but this operation is successful only when the thrombus is new—after a few days it is often impossible.

In pulmonary embolism intravenous injection and infiltration of the stellate ganglia with novocain, together with heparinisation, have minimised the need for Trendelenburg's operation.

Oedema, pain, and skin changes due to phlebitis are best treated by ganglionectomy, with or without resection of the segment of vein concerned. Here phlebography is a help.

After trauma the large veins can often be easily sutured especially the vena cava. A wound of the portal vein must always be sutured, provided a portocaval anastomosis has previously been effected otherwise it will be fatal.—*Lancet*, **2**: 519, 1947.